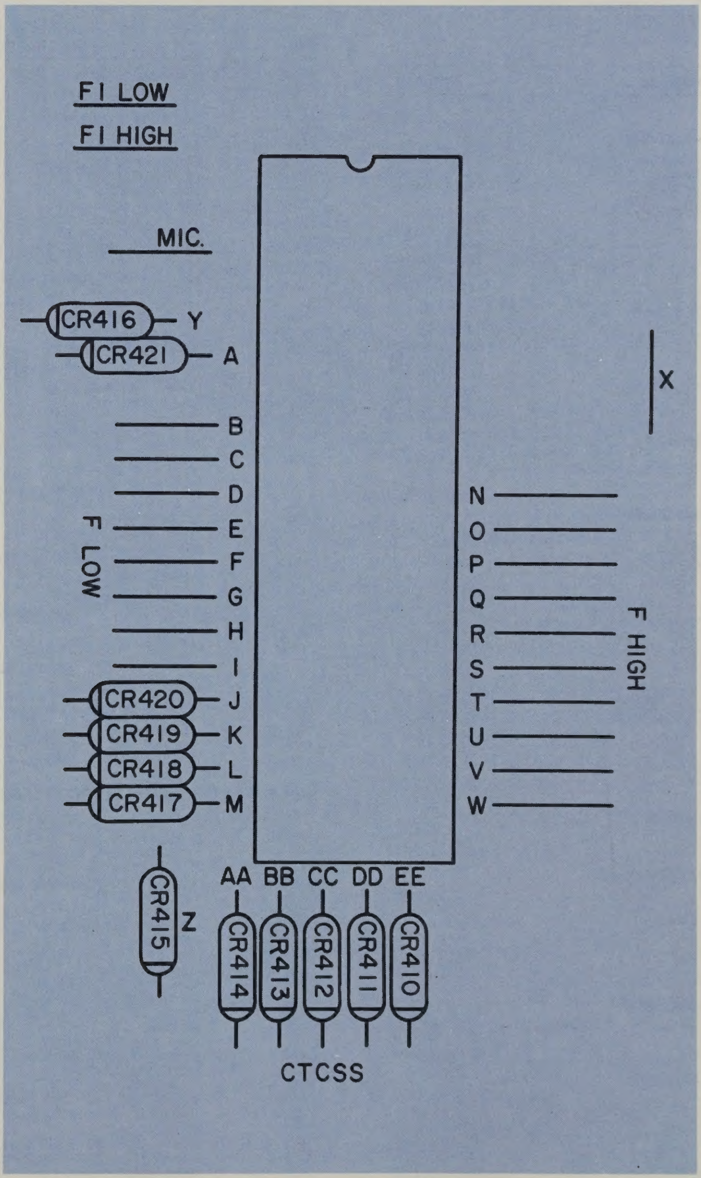
Regency®

COMMUNICATIONS, INC.

XL2000 SERVICE MANUAL



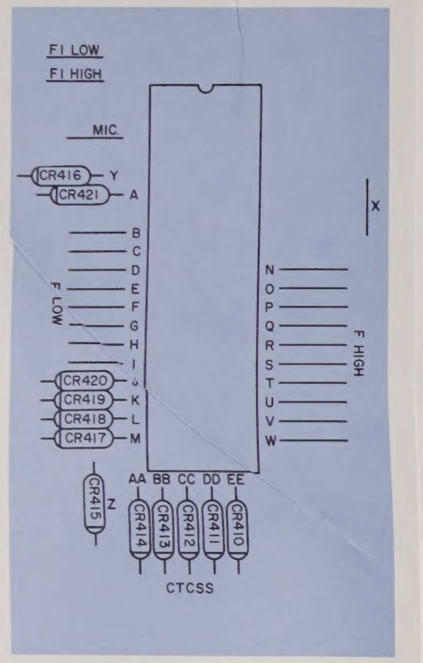
Model XLH252

3/81

Part No. 0300-4161-200

Frequency and Tone Selection Procedures

The frequency and tone configurations you desire for the XL 2000 are determined by clipping the various jumper wires and diode wires specified for the desired configuration. The illustration to the right shows the diodes and jumpers involved in the process. Please note the letters on the illustration and the circuit board correspond to the columns in the tables that follow. These tables indicate the diodes or jumpers to be clipped with an "X", while jumpers or diodes tabled with a "1" should remain connected. There are three separate tables. First is a table of frequencies for single channel or lower frequency of two channel programming. The second table is used for programming the higher of two frequencies. CTCSS tone programming is done through the third table. For example: using Table One a single channel frequency of 161.010 calls for clipping jumpers: B, D, F, G, H, K and M. Select the configuration you desire using the steps outlined below. We suggest you first review one channel procedures before proceeding to the more detailed two channel section. Please note: jumpers and diodes are referred to as being to the left or right of processor as oriented in illustration at right.



One Channel

Simplex with tone: 1. Clip F LOW diodes and jumpers at left of processor as indicated in table for the frequency you select. 2. Clip jumper on upper left marked F1 HIGH. 3. Clip all jumpers N through W on right of processor (bank marked F HIGH). 4. Clip diodes indicated in CTCSS table for the tone frequency you have selected. (For example: clip diode EE for 233.6 Hz.)

Simplex without tone (MSG light disabled): 1. Clip F LOW diodes and jumpers as indicated in table for the frequency you select. 2. Clip all ten jumpers marked N through W in bank labeled F HIGH at right of processor. 3. Clip jumper labled "MIC" at upper left of processor. 4. Clip "Z" diode at lower left. 5. Turn tone deviation pot (R517) to the minimum position (Maximum CW).

Half Duplex with CTCSS: 1. Clip the F LOW diodes and jumpers at left of processor for the lower frequency, transmit or receive. 2. Clip F HIGH jumpers at right of processor for remaining frequency – higher frequency. Note: To program the higher frequency you must refer to Table Two, F HIGH. Subtract the lower from the higher frequency and reference the difference in Table Two. For example: for frequencies 161.010 MHz and 160.620 MHz the difference of 390 kHz calls for cutting jumpers N, O, P, R, S, and W. 3. Clip "X" jumper at upper right of processor if the higher frequency is receive. Leave connected if F HIGH is transmit. 4. Clip F1 LOW and F1 HIGH jumpers at upper left. 5. Clip "Y" diode at upper left. 6. Clip CTCSS diodes as indicated in CTCSS table, Table Three, for tone selected.

Half Duplex, NO CTCSS (MSG light disabled): 1. Clip F LOW diodes and jumpers at left of processor for lower frequency, transmit or receive. 2. Clip F HIGH jumpers at right for higher of the two frequencies. Note: for this procedure you will need to subtract lower from higher frequency and reference difference in Table Two for programming. See half duplex with CTCSS paragraph above for details. 3. Clip "X" jumper if higher frequency is receive. Leave connected if transmit frequency is higher. 4. Clip F1 LOW and F1 HIGH channel selector jumper at upper left. 5. Clip "Y" diode at upper left. 6. Clip "MIC" jumper at upper left. 7. Adjust tone deviation pot (R517) to minimum (Max. CW).

Two Channel

Simplex – both channels with CTCSS: 1. Clip F LOW diodes and jumpers at left of processor for lower of the two frequencies. 2. Clip F HIGH jumpers at right of processor for higher of the two channel frequencies. NOTE: For this procedure you will need to subtract one frequency from the other and reference the difference in Table Two. For example: for frequencies of 161.010 MHz and 160.620 MHz the difference of

Continued at end of Tables

Table One X = Clip

(kHz)	ABCDEFGHIJKLM	(kHz)	ABCDEFGHIJKLM	(kHz)	ABCDEFGHIJKLM	(kHz)	ABCDEFGHIJKLM	(kHz)	ABCDEFGHIJKLM	(kHz)	ABCDEFGHIJKLM	(kHz)	ABCDEFGHIJKLM	(kHz)	ABCDEFGHIJKLM	(kHz)	ABCDEFGHIJKLM	(kHz)	ABCDEFGHIJKLM
150775	X11X1XXX11X11	151955	X111XXXXXX111	153590	X1111X1XX111X	154665	1XXXXXX1XX1X1	155655	1XXXX111X1X11	158205	1XX1X111X1XX1	159075	1XX111XX1X111	159720	1X1XXXXX11XXX	160350	1X1XX1XX1X11X	160980	1X1X1XXX1X1XX
150790	X11X1XXX1111X	151985	X111XXXXX11X1	153605	X1111X1X1XXX1	154680	1XXXXXX1X1XXX	155670	1XXXX111X111X	158220	1XX1X111X11XX	159090	1XX111XX11X1X	159735	1X1XXXXX11X11	160365	1X1XX1XX11XX1	160995	1X1X1XXX1X111
150815	X11X1XX1XXX11	152270	X111XX1XXX11X	153620	X1111X1X1X1XX	154695	1XXXXXX1X1X11	155685	1XXXX1111XXX1	158235	1XX1X111X1111	159105	1XX111XX111X1	159750	1X1XXXXX1111X	160380	1X1XX1XX111XX	161010	1X1X1XXX11X1X
150830	X11X1XX1XX11X	152285	X111XX1XX1XX1	153635	X1111X1X1X111	154710	1XXXXXX1X111X	155700	1XXXX1111X1XX	158250	1XX1X1111XX1X	159120	1XX111X1XXXXX	159765	1X1XXXX1XXXX1	160395	1X1XX1XX11111	161025	1X1X1XXX111X1
150845	X11X1XX1X1XX1	152300	X111XX1XX11XX	153650	X1111X1X11X1X	154725	1XXXXXX11XXX1	155715	1XXXX1111X111	158265	1XX1X1111X1X1	159135	1XX111X1XXX11	159780	1X1XXXX1XX1XX	160410	1X1XX1X1XXX1X	161040	1X1X1XX1XXXXX
150860	X11X1XX1X11XX	152315	X111XX1XX1111	153665	X1111X1X111X1	154740	1XXXXXX11X1XX	155730	1XXXX11111X1X	158280	1XX1X11111XXX	159150	1XX111X1XX11X	159795	1X1XXXX1XX111	160425	1X1XX1X1XX1X1	161055	1X1X1XX1XXX11
150875	X11X1XX1X1111	152330	X111XX1X1XX1X	153680	X1111X11XXXXX	154755	1XXXXXX11X111	155745	1XXXX111111X1	158295	1XX1X11111X11	159165	1XX111X1X1XX1	159810	1X1XXXX1X1X1X	160440	1X1XX1X1X1XXX	161070	1X1X1XX1XX11X
150890	X11X1XX11XX1X	152345	X111XX1X1X1X1	153695	X1111X11XXX11	154770	1XXXXXX111X1X	155760	1XXX1XXXXXXXX	158310	1XX1X1111111X	159180	1XX111X1X11XX	159825	1X1XXXX1X11X1	160455	1X1XX1X1X1X11	161085	1X1X1XX1X1XX1
150905	X11X1XX11X1X1	152360	X111XX1X11XXX	153710	X1111X11XX11X	154785	1XXXXXX1111X1	155775	1XXX1XXXXXX11	158325	1XX11XXXXXXX1	159195	1XX111X1X1111	159840	1X1XXXX11XXXX	160470	1X1XX1X1X111X	161100	1X1X1XX1X11XX
150920	X11X1XX111XXX	152375	X111XX1X11X11	153725	X1111X11X1XX1	154800	1XXXXX1XXXXXX	155790	1XXX1XXXXX11X	158340	1XX11XXXXX1XX	159210	1XX111X11XX1X	159855	1X1XXXX11XX11	160485	1X1XX1X11XXX1	161115	1X1X1XX1X1111
150935	X11X1XX111X11	152390	X111XX1X1111X	153740	X1111X11X11XX	154815	1XXXXX1XXXX11	155805	1XXX1XXXX1XX1	158355	1XX11XXXXX111	159225	1XX111X11X1X1	159870	1X1XXXX11X11X	160500	1X1XX1X11X1XX	161130	1X1X1XX11XX1X
150950	X11X1XX11111X	152405	X111XX11XXXX1	153755	X1111X11X1111	154830	1XXXXX1XXX11X	155820	1XXX1XXXX11XX	158370	1XX11XXXX1X1X	159240	1XX111X111XXX	159885	1X1XXXX111XX1	160515	1X1XX1X11X111	161145	1X1X1XX11X1X1
150965	X11X1X1XXXXX1	152420	X111XX11XX1XX	153770	X1111X111XX1X	154845	1XXXXX1XX1XX1	155835	1XXX1XXXX1111	158385	1XX11XXXX11X1	159255	1XX111X111X11	159900	1X1XXXX1111XX	160530	1X1XX1X111X1X	161160	1X1X1XX111XXX
150980	X11X1X1XXX1XX	152435	X111XX11XX111	153785	X1111X111X1X1	154860	1XXXXX1XX11XX	155850	1XXX1XXX1XX1X	158400	1XX11XXX1XXXX	159270	1XX111X11111X	159915	1X1XXXX111111	160545	1X1XX1X1111X1	161175	1X1X1XX111X11
150995	X11X1X1XXX111	152450	X111XX11X1X1X	153800	X1111X1111XXX	154875	1XXXXX1XX1111	155865	1XXX1XXX1X1X1	158415	1XX11XXX1XX11	159285	1XX1111XXXXX1	159930	1X1XXX1XXXX1X	160560	1X1XX11XXXXXX	161190	1X1X1XX11111X
151010	X11X1X1XX1X1X	152465	X111XX11X11X1	153815	X1111X1111X11	154890	1XXXXX1X1XX1X	155880	1XXX1XXX11XXX	158430	1XX11XXX1X11X	159300	1XX1111XXX1XX	159945	1X1XXX1XXX1X1	160575	1X1XX11XXXX11	161205	1X1X1X1XXXXX1
151025	X11X1X1XX11X1	152480	X111XX111XXXX	153830	X1111X111111X	154905	1XXXXX1X1X1X1	155895	1XXX1XXX11X11	158445	1XX11XXX11XX1	159315	1XX1111XXX111	159960	1X1XXX1XX1XXX	160590	1X1XX11XXX11X	161220	1X1X1X1XXX1XX
151040	X11X1X1X1XXXX	152870	X111X1X11111X	153845	X11111XXXXXX1	154920	1XXXXX1X11XXX	155910	1XXX1XXX1111X	158460	1XX11XXX111XX	159330	1XX1111XX1X1X	159975	1X1XXX1XX1X11	160605	1X1XX11XX1XX1	161235	1X1X1X1XXX111
151055	X11X1X1X1XX11	152885	X111X11XXXXX1	153860	X11111XXXX1XX	154935	1XXXXX1X11X11	155925	1XXX1XX1XXXX1	158480	1XX11XX1XXXXX	159345	1XX1111XX11X1	159990	1X1XXX1XX111X	160620	1X1XX11XX11XX	161250	1X1X1X1XX1X1X
151070	X11X1X1X1X11X	152890	X111X11XXXX1X	153875	X11111XXXX111	154950	1XXXXX1X1111X	155940	1XXX1XX1XX1XX	158730	1XX11X1X1XX1X	159360	1XX1111X1XXXX	160005	1X1XXX1X1XXX1	160635	1X1XX11XX1111	161265	1X1X1X1XX11X1
151085	X11X1X1X11XX1	152900	X111X11XXX1XX	153890	X11111XXX1X1X	154965	1XXXXX11XXXX1	155955	1XXX1XX1XX111	158745	1XX11X1X1X1X1	159375	1XX1111X1XX11	160020	1X1XXX1X1X1XX	160650	1X1XX11X1XX1X	161280	1X1X1X1X1XXXX
151100	X11X1X1X111XX	152915	X111X11XXX111	153905	X11111XXX11X1	154980	1XXXXX11XX1XX	155970	1XXX1XX1X1X1X	158760	1XX11X1X11XXX	159390	1XX1111X1X11X	160035	1X1XXX1X1X111	160665	1X1XX11X1X1X1	161295	1X1X1X1X1XX11
151115	X11X1X1X11111	152930	X111X11XX1X1X	153920	X11111XX1XXXX	154995	1XXXXX11XX111	155985	1XXX1XX1X11X1	158775	1XX11X1X11X11	159405	1XX1111X11XX1	160050	1X1XXX1X11X1X	160680	1X1XX11X11XXX	161310	1X1X1X1X1X11X
151130	X11X1X11XXX1X	152945	X111X11XX11X1	153935	X11111XX1XX11	155010	1XXXXX11X1X1X	156000	1XXX1XX11XXXX	158790	1XX11X1X1111X	159420	1XX1111X111XX	160065	1X1XXX1X111X1	160695	1X1XX11X11X11	161325	1X1X1X1X11XX1
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151160	X11X1X11X1XXX	152975	X111X11X1XX11	153965	X11111XX11XX1	155040	1XXXXX111XXXX	156030	1XXX1XX11X11X	158820	1XX11X11XX1XX	159450	1XX11111XXX1X	160095	1X1XXX11XXX11	160725	1X1XX111XXXX1	161355	1X1X1X1X11111
151175	X11X1X11X1X11	152990	X111X11X1X11X	153980	X11111XX111XX	155055	1XXXXX111XX11	156045	1XXX1XX111XX1	158835	1XX11X11XX111	159465	1XX11111XX1X1	160110	1X1XXX11XX11X	160740	1X1XX111XX1XX	161370	1X1X1X11XXX1X
151190	X11X1X11X111X	153065	X111X11X11XX1	153995	X11111XX11111	155070	1XXXXX111X11X	156075	1XXX1XX111111	158850	1XX11X11X1X1X	159495	1XX11111X1X11	160125	1X1XXX11X1XX1	160755	1X1XX111XX111	161385	1X1X1X11XX1X1
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151220	X11X1X111X1XX	153035	X111X11X11111	154025	X11111X1XX1X1	155100	1XXXXX11111XX	156105	1XXX1X1XXX1X1	158880	1XX11X111XXXX	159525	1XX111111XXX1	160155	1X1XXX11X1111	160785	1X1XX111X11X1	161415	1X1X1X11X1X11
151235	X11X1X111X111	153050	X111X111XXX1X	154040	X11111X1X1XXX	155115	1XXXXX1111111	156120	1XXX1X1XX1XXX	158895	1XX11X111XX11	159540	1XX111111X1XX	160170	1X1XXX111XX1X	160800	1X1XX1111XXXX	161430	1X1X1X11X111X
151250	X11X1X1111X1X	153065	X111X111XX1X1	154055	X11111X1X1X11	155130	1XXXX1XXXXX1X	156135	1XXX1X1XX1X11	158910	1XX11X111X11X	159555	1XX111111X111	160185	1X1XXX111X1X1	160815	1X1XX1111XX11	161445	1X1X1X111XXX1
151265	X11X1X11111X1	153080	X111X111X1XXX	154070	X11111X1X111X	155145	1XXXX1XXXX1X1	156150	1XXX1X1XX111X	158925	1XX11X1111XX1	159570	1XX1111111X1X	160200	1X1XXX1111XXX	160830	1X1XX1111X11X	161460	1X1X1X111X1XX
151280	X11X11XXXXXXX	153095	X111X111X1X11	154085	X11111X11XXX1	155160	1XXXX1XXX1XXX	156165	1XXX1X1X1XXX1	158940	1XX11X11111XX	159585	1XX11111111X1	160215	1X1XXX1111X11	160845	1X1XX11111XX1	161475	1X1X1X111X111
151295	X11X11XXXXX11	153110	X111X111X111X	154100	X11111X11X1XX	155175	1XXXX1XXX1X11	156180	1XXX1X1X1X1XX	158955	1XX11X1111111	159600	1X1XXXXXXXXXX	160230	1X1XXX111111X	160860	1X1XX111111XX	161490	1X1X1X1111X1X
151310	X11X11XXXX11X	153125	X111X1111XXX1	154115	X11111X11X111	155190	1XXXX1XXX111X	156195	1XXX1X1X1X111	158970	1XX111XXXXX1X	159615	1X1XXXXXXXX11	160245	1X1XX1XXXXXX1	160875	1X1XX11111111	161505	1X1X1X11111X1
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151355	X11X11XXX1111	153170	X111X11111X1X	154160	X111111XXXXXX	155235	1XXXX1XX1X111	156240	1XXX1X11XXXXX	159015	1XX111XXX1X11	159660	1X1XXXXXX11XX	160290	1X1XX1XXX1X1X	160920	1X1X1XXXX1XXX	161550	1X1X11XXXX11X
151370	X11X11XX1XX1X	153185	X111X111111X1	154175	X111111XXXX11	155250	1XXXX1XX11X1X	157050	1XX1XXXXXXX1X	159030	1XX111XXX111X	159675	1X1XXXXXX1111	160305	1X1XX1XXX11X1	160935	1X1X1XXXX1X11	161565	1X1X11XXX1XX1
151385	X11X11XX1X1X1	153200	X1111XXXXXXXX	154190	X111111XXX11X	155265	1XXXX1XX111X1	157110	1XX1XXXXX111X	159045	1XX111XX1XXX1	159690	1X1XXXXX1XX1X	160320	1X1XX1XX1XXXX	160950	1X1X1XXXX111X		
151400	X11X11XX11XXX	153215	X1111XXXXXX11	154205	X111111XX1XX1	155280	1XXXX1X1XXXXX	157450	1XX1XX1X1XX1X	159060	1XX111XX1X1XX	159705	1X1XXXXX1X1X1	160335	1X1XX1XX1XX11	160965	1X1X1XXX1XXX1		
151415	X11X11XX11X11	153230	X1111XXXXX11X	154220	X111111XX11XX	155295	1XXXX1X1XXX11	157470	1XX1XX1X1X11X										
151430	X11X11XX1111X	153245	X1111XXXX1XX1	154235	X111111XX1111	155310	1XXXX1X1XX11X	157485	1XX1XX1X11XX1										
151445	X11X11X1XXXX1	153260	X1111XXXX11XX	154250	X111111X1XX1X	155325	1XXXX1X1X1XX1	157500	1XX1XX1X111XX										
151460	X11X11X1XX1XX	153275	X1111XXXX1111	154265	X111111X1X1X1	155340	1XXXX1X1X11XX	157515	1XX1XX1X11111										
151475	X11X11X1XX111	153290	X1111XXX1XX1X	154280	X111111X11XXX	155355	1XXXX1X1X1111	157530	1XX1XX11XXX1X										
151490	X11X11X1X1X1X	153305	X1111XXX1X1X1	154295	X111111X11X11	155370	1XXXX1X11XX1X	157545	1XX1XX11XX1X1										
151505	X11X11X1X11X1	153320	X1111XXX11XXX	154310	X111111X1111X	155385	1XXXX1X11X1X1	157560	1XX1XX11X1XXX										
151520	X11X11X11XXXX	153335	X1111XXX11X11	154325	X1111111XXXX1	155400	1XXXX1X111XXX	157575	1XX1XX11X1X11										
151535	X11X11X11XX11	153350	X1111XXX1111X	154340	X1111111XX1XX	155415	1XXXX1X111X11	157590	1XX1XX11X111X										
151550	X11X11X11X11X	153365	X1111XX1XXXX1	154355	X1111111XX111	155430	1XXXX1X11111X	157605	1XX1XX111XXX1										
151565	X11X11X111XX1	153380	X1111XX1XX1XX	154370	X1111111X1X1X	155445	1XXXX11XXXXX1	157620	1XX1XX111X1XX										
151580	X11X11X1111XX	153395	X1111XX1XX111	154385	X1111111X11X1	155460	1XXXX11XXX1XX	157635	1XX1XX111X111										
151595	X11X11X111111	153410	X1111XX1X1X1X	154400	X11111111XXXX	155475	1XXXX11XXX111	157650	1XX1XX1111X1X										
151625	X11X111XXX1X1	153425	X1111XX1X11X1	154415	X11111111XX11	155490	1XXXX11XX1X1X	157665	1XX1XX11111X1										
151655	X11X111XX1X11	153440	X1111XX11XXXX	154430	X11111111X11X	155505	1XXXX11XX11X1	157680	1XX1X1XXXXXXX										
151685	X11X111X1XXX1	153455	X1111XX11XX11	154445	X111111111XX1	155520	1XXXX11X1XXXX	157695	1XX1X1XXXXX11										
151715	X11X111X1X111	153470	X1111XX11X11X	154490	1XXXXXXXXXX1X	155535	1XXXX11X1XX11	157710	1XX1X1XXXX11X										
151745	X11X111X111X1	153485	X1111XX111XX1	154515	1XXXXXXXXX111	155550	1XXXX11X1X11X	157725	1XX1X1XXX1XX1										
151775	X11X1111XXX11	153500	X1111XX1111XX	154540	1XXXXXXXX11XX	155565	1XXXX11X11XX1	157740	1XX1X1XXX11XX										
151805	X11X1111X1XX1	153515	X1111XX111111	154570	1XXXXXXX1XX1X	155580	1XXXX11X111XX	158130	1XX1X11X11X1X										
151835	X11X1111X1111	153530	X1111X1XXXX1X	154585	1XXXXXXX1X1X1	155595	1XXXX11X11111	158145	1XX1X11X111X1										
151865	X11X11111X1X1	153545	X1111X1XXX1X1	154600	1XXXXXXX11XXX	155610	1XXXX111XXX1X	158160	1XX1X111XXXXX										
151895	X11X111111X11	153560	X1111X1XX1XXX	154625	1XXXXXXX111X1	155625	1XXXX111XX1X1	158175	1XX1X111XXX11										
151925	X111XXXXXXXX1	153575	X1111X1XX1X11	154650	1XXXXXX1XXX1X	155640	1XXXX111X1XXX	158190	1XX1X111XX11X										

Table Two X = Clip

(kHz)	NOPQRSTUVW	(kHz)	NOPQRSTUVW	(kHz)	NOPQRSTUVW	(kHz)	NOPQRSTUVW	(kHz)	NOPQRSTUVW	(kHz)	NOPQRSTUVW
0	XXXXXXXXXX	105	XXXXX1X1X1	210	XXXX1X1X1X	315	XXXX111111	420	XXX1X1X1XX	525	XXX11X1XX1
5	XXXXXXXXX1	110	XXXXX1X11X	215	XXXX1X1X11	320	XXX1XXXXXX	425	XXX1X1X1X1	530	XXX11X1X1X
10	XXXXXXXX1X	115	XXXXX1X111	220	XXXX1X11XX	325	XXX1XXXXX1	430	XXX1X1X11X	535	XXX11X1X11
15	XXXXXXXX11	120	XXXXX11XXX	225	XXXX1X11X1	330	XXX1XXXX1X	435	XXX1X1X111	540	XXX11X11XX
20	XXXXXXX1XX	125	XXXXX11XX1	230	XXXX1X111X	335	XXX1XXXX11	440	XXX1X11XXX	545	XXX11X11X1
25	XXXXXXX1X1	130	XXXXX11X1X	235	XXXX1X1111	340	XXX1XXX1XX	445	XXX1X11XX1	550	XXX11X111X
30	XXXXXXX11X	135	XXXXX11X11	240	XXXX11XXXX	345	XXX1XXX1X1	450	XXX1X11X1X	555	XXX11X1111
35	XXXXXXX111	140	XXXXX111XX	245	XXXX11XXX1	350	XXX1XXX11X	455	XXX1X11X11	560	XXX111XXXX
40	XXXXXX1XXX	145	XXXXX111X1	250	XXXX11XX1X	355	XXX1XXX111	460	XXX1X111XX	565	XXX111XXX1
45	XXXXXX1XX1	150	XXXXX1111X	255	XXXX11XX11	360	XXX1XX1XXX	465	XXX1X111X1	570	XXX111XX1X
50	XXXXXX1X1X	155	XXXXX11111	260	XXXX11X1XX	365	XXX1XX1XX1	470	XXX1X1111X	575	XXX111XX11
55	XXXXXX1X11	160	XXXX1XXXXX	265	XXXX11X1X1	370	XXX1XX1X1X	475	XXX1X11111	580	XXX111X1XX
60	XXXXXX11XX	165	XXXX1XXXX1	270	XXXX11X11X	375	XXX1XX1X11	480	XXX11XXXXX	585	XXX111X1X1
65	XXXXXX11X1	170	XXXX1XXX1X	275	XXXX11X111	380	XXX1XX11XX	485	XXX11XXXX1	590	XXX111X11X
70	XXXXXX111X	175	XXXX1XXX11	280	XXXX111XXX	385	XXX1XX11X1	490	XXX11XXX1X	595	XXX111X111
75	XXXXXX1111	180	XXXX1XX1XX	285	XXXX111XX1	390	XXX1XX111X	495	XXX11XXX11	600	XXX1111XXX
80	XXXXX1XXXX	185	XXXX1XX1X1	290	XXXX111X1X	395	XXX1XX1111	500	XXX11XX1XX	605	XXX1111XX1
85	XXXXX1XXX1	190	XXXX1XX11X	295	XXXX111X11	400	XXX1X1XXXX	505	XXX11XX1X1	610	XXX1111X1X
90	XXXXX1XX1X	195	XXXX1XX111	300	XXXX1111XX	405	XXX1X1XXX1	510	XXX11XX11X	615	XXX1111X11
95	XXXXX1XX11	200	XXXX1X1XXX	305	XXXX1111X1	410	XXX1X1XX1X	515	XXX11XX111	620	XXX11111XX
100	XXXXX1X1XX	205	XXXX1X1XX1	310	XXXX11111X	415	XXX1X1XX11	520	XXX11X1XXX	625	XXX11111X1

(kHz)	NOPQRSTUVW	(kHz)	NOPQRSTUVW	(kHz)	NOPQRSTUVW	(kHz)	NOPQRSTUVW	(kHz)	NOPQRSTUVW	(kHz)	NOPQRSTUVW
630	XXX111111X	960	XX11XXXXXX	1290	X1XXXXXX1X	1620	X1X1XXX1XX	1950	X11XXXX11X	2280	X111XX1XXX
635	XXX1111111	965	XX11XXXXX1	1295	X1XXXXXX11	1625	X1X1XXX1X1	1955	X11XXXX111	2285	X111XX1XX1
640	XX1XXXXXXX	970	XX11XXXX1X	1300	X1XXXXX1XX	1630	X1X1XXX11X	1960	X11XXX1XXX	2290	X111XX1X1X
645	XX1XXXXXX1	975	XX11XXXX11	1305	X1XXXXX1X1	1635	X1X1XXX111	1965	X11XXX1XX1	2295	X111XX1X11
650	XX1XXXXX1X	980	XX11XXX1XX	1310	X1XXXXX11X	1640	X1X1XX1XXX	1970	X11XXX1X1X	2300	X111XX11XX
655	XX1XXXXX11	985	XX11XXX1X1	1315	X1XXXXX111	1645	X1X1XX1XX1	1975	X11XXX1X11	2305	X111XX11X1
660	XX1XXXX1XX	990	XX11XXX11X	1320	X1XXXX1XXX	1650	X1X1XX1X1X	1980	X11XXX11XX	2310	X111XX111X
665	XX1XXXX1X1	995	XX11XXX111	1325	X1XXXX1XX1	1655	X1X1XX1X11	1985	X11XXX11X1	2315	X111XX1111
670	XX1XXXX11X	1000	XX11XX1XXX	1330	X1XXXX1X1X	1660	X1X1XX11XX	1990	X11XXX111X	2320	X111X1XXXX
675	XX1XXXX111	1005	XX11XX1XX1	1335	X1XXXX1X11	1665	X1X1XX11X1	1995	X11XXX1111	2325	X111X1XXX1
680	XX1XXX1XXX	1010	XX11XX1X1X	1340	X1XXXX11XX	1670	X1X1XX111X	2000	X11XX1XXXX	2330	X111X1XX1X
685	XX1XXX1XX1	1015	XX11XX1X11	1345	X1XXXX11X1	1675	X1X1XX1111	2005	X11XX1XXX1	2335	X111X1XX11
690	XX1XXX1X1X	1020	XX11XX11XX	1350	X1XXXX111X	1680	X1X1X1XXXX	2010	X11XX1XX1X	2340	X111X1X1XX
695	XX1XXX1X11	1025	XX11XX11X1	1355	X1XXXX1111	1685	X1X1X1XXX1	2015	X11XX1XX11	2345	X111X1X1X1
700	XX1XXX11XX	1030	XX11XX111X	1360	X1XXX1XXXX	1690	X1X1X1XX1X	2020	X11XX1X1XX	2350	X111X1X11X
705	XX1XXX11X1	1035	XX11XX1111	1365	X1XXX1XXX1	1695	X1X1X1XX11	2025	X11XX1X1X1	2355	X111X1X111
710	XX1XXX111X	1040	XX11X1XXXX	1370	X1XXX1XX1X	1700	X1X1X1X1XX	2030	X11XX1X11X	2360	X111X11XXX
715	XX1XXX1111	1045	XX11X1XXX1	1375	X1XXX1XX11	1705	X1X1X1X1X1	2035	X11XX1X111	2365	X111X11XX1
720	XX1XX1XXXX	1050	XX11X1XX1X	1380	X1XXX1X1XX	1710	X1X1X1X11X	2040	X11XX11XXX	2370	X111X11X1X
725	XX1XX1XXX1	1055	XX11X1XX11	1385	X1XXX1X1X1	1715	X1X1X1X111	2045	X11XX11XX1	2375	X111X11X11
730	XX1XX1XX1X	1060	XX11X1X1XX	1390	X1XXX1X11X	1720	X1X1X11XXX	2050	X11XX11X1X	2380	X111X111XX
735	XX1XX1XX11	1065	XX11X1X1X1	1395	X1XXX1X111	1725	X1X1X11XX1	2055	X11XX11X11	2385	X111X111X1
740	XX1XX1X1XX	1070	XX11X1X11X	1400	X1XXX11XXX	1730	X1X1X11X1X	2060	X11XX111XX	2390	X111X1111X
745	XX1XX1X1X1	1075	XX11X1X111	1405	X1XXX11XX1	1735	X1X1X11X11	2065	X11XX111X1	2395	X111X11111
750	XX1XX1X11X	1080	XX11X11XXX	1410	X1XXX11X1X	1740	X1X1X111XX	2070	X11XX1111X	2400	X1111XXXXX
755	XX1XX1X111	1085	XX11X11XX1	1415	X1XXX11X11	1745	X1X1X111X1	2075	X11XX11111	2405	X1111XXXX1
760	XX1XX11XXX	1090	XX11X11X1X	1420	X1XXX111XX	1750	X1X1X1111X	2080	X11X1XXXXX	2410	X1111XXX1X
765	XX1XX11XX1	1095	XX11X11X11	1425	X1XXX111X1	1755	X1X1X11111	2085	X11X1XXXX1	2415	X1111XXX11
770	XX1XX11X1X	1100	XX11X111XX	1430	X1XXX1111X	1760	X1X11XXXXX	2090	X11X1XXX1X	2420	X1111XX1XX
775	XX1XX11X11	1105	XX11X111X1	1435	X1XXX11111	1765	X1X11XXXX1	2095	X11X1XXX11	2425	X1111XX1X1
780	XX1XX111XX	1110	XX11X1111X	1440	X1XX1XXXXX	1770	X1X11XXX1X	2100	X11X1XX1XX	2430	X1111XX11X
785	XX1XX111X1	1115	XX11X11111	1445	X1XX1XXXX1	1775	X1X11XXX11	2105	X11X1XX1X1	2435	X1111XX111
790	XX1XX1111X	1120	XX111XXXXX	1450	X1XX1XXX1X	1780	X1X11XX1XX	2110	X11X1XX11X	2440	X1111X1XXX
795	XX1XX11111	1125	XX111XXXX1	1455	X1XX1XXX11	1785	X1X11XX1X1	2115	X11X1XX111	2445	X1111X1XX1
800	XX1X1XXXXX	1130	XX111XXX1X	1460	X1XX1XX1XX	1790	X1X11XX11X	2120	X11X1X1XXX	2450	X1111X1X1X
805	XX1X1XXXX1	1135	XX111XXX11	1465	X1XX1XX1X1	1795	X1X11XX111	2125	X11X1X1XX1	2455	X1111X1X11
810	XX1X1XXX1X	1140	XX111XX1XX	1470	X1XX1XX11X	1800	X1X11X1XXX	2130	X11X1X1X1X	2460	X1111X11XX
815	XX1X1XXX11	1145	XX111XX1X1	1475	X1XX1XX111	1805	X1X11X1XX1	2135	X11X1X1X11	2465	X1111X11X1
820	XX1X1XX1XX	1150	XX111XX11X	1480	X1XX1X1XXX	1810	X1X11X1X1X	2140	X11X1X11XX	2470	X1111X111X
825	XX1X1XX1X1	1155	XX111XX111	1485	X1XX1X1XX1	1815	X1X11X1X11	2145	X11X1X11X1	2475	X1111X1111
830	XX1X1XX11X	1160	XX111X1XXX	1490	X1XX1X1X1X	1820	X1X11X11XX	2150	X11X1X111X	2480	X11111XXXX
835	XX1X1XX111	1165	XX111X1XX1	1495	X1XX1X1X11	1825	X1X11X11X1	2155	X11X1X1111	2485	X11111XXX1
840	XX1X1X1XXX	1170	XX111X1X1X	1500	X1XX1X11XX	1830	X1X11X111X	2160	X11X11XXXX	2490	X11111XX1X
845	XX1X1X1XX1	1175	XX111X1X11	1505	X1XX1X11X1	1835	X1X11X1111	2165	X11X11XXX1	2495	X11111XX11
850	XX1X1X1X1X	1180	XX111X11XX	1510	X1XX1X111X	1840	X1X111XXXX	2170	X11X11XX1X	2500	X11111X1XX
855	XX1X1X1X11	1185	XX111X11X1	1515	X1XX1X1111	1845	X1X111XXX1	2175	X11X11XX11	2505	X11111X1X1
860	XX1X1X11XX	1190	XX111X111X	1520	X1XX11XXXX	1850	X1X111XX1X	2180	X11X11X1XX	2510	X11111X11X
865	XX1X1X11X1	1195	XX111X1111	1525	X1XX11XXX1	1855	X1X111XX11	2185	X11X11X1X1	2515	X11111X111
870	XX1X1X111X	1200	XX1111XXXX	1530	X1XX11XX1X	1860	X1X111X1XX	2190	X11X11X11X	2520	X111111XXX
875	XX1X1X1111	1205	XX1111XXX1	1535	X1XX11XX11	1865	X1X111X1X1	2190	X11X11X111	2525	X111111XX1
880	XX1X11XXXX	1210	XX1111XX1X	1540	X1XX11X1XX	1870	X1X111X11X	2200	X11X111XXX	2530	X111111X1X
885	XX1X11XXX1	1215	XX1111XX11	1545	X1XX11X1X1	1875	X1X111X111	2205	X11X111XX1	2535	X111111X11
890	XX1X11XX1X	1220	XX1111X1XX	1550	X1XX11X11X	1880	X1X1111XXX	2210	X11X111X1X	2540	X1111111XX
895	XX1X11XX11	1225	XX1111X1X1	1555	X1XX11X111	1885	X1X1111XX1	2215	X11X111X11	2545	X1111111X1
900	XX1X11X1XX	1230	XX1111X11X	1560	X1XX111XXX	1890	X1X1111X1X	2220	X11X1111XX	2550	X11111111X
905	XX1X11X1X1	1235	XX1111X111	1565	X1XX111XX1	1895	X1X1111X11	2225	X11X1111X1	2555	X111111111
910	XX1X11X11X	1240	XX11111XXX	1570	X1XX111X1X	1900	X1X11111XX	2230	X11X11111X	2560	1XXXXXXXXX
915	XX1X11X111	1245	XX11111XX1	1575	X1XX111X11	1905	X1X11111X1	2235	X11X111111	2565	1XXXXXXXX1
920	XX1X111XXX	1250	XX11111X1X	1580	X1XX1111XX	1910	X1X111111X	2240	X111XXXXXX	2570	1XXXXXXX1X
925	XX1X111XX1	1255	XX11111X11	1585	X1XX1111X1	1915	X1X1111111	2245	X111XXXXX1	2575	1XXXXXXX11
930	XX1X111X1X	1260	XX111111XX	1590	X1XX11111X	1920	X11XXXXXXX	2250	X111XXXX1X	2580	1XXXXXX1XX
935	XX1X111X11	1265	XX111111X1	1595	X1XX111111	1925	X11XXXXXX1	2255	X111XXXX11	2585	1XXXXXX1X1
940	XX1X1111XX	1270	XX1111111X	1600	X1X1XXXXXX	1930	X11XXXXX1X	2260	X111XXX1XX	2590	1XXXXXX11X
945	XX1X1111X1	1275	XX11111111	1605	X1X1XXXXX1	1935	X11XXXXX11	2265	X111XXX1X1	2595	1XXXXXX111
950	XX1X11111X	1280	X1XXXXXXXX	1610	X1X1XXXX1X	1940	X11XXXX1XX	2270	X111XXX11X	2600	1XXXXX1XXX
955	XX1X111111	1285	X1XXXXXXX1	1615	X1X1XXXX11	1945	X11XXXX1X1	2275	X111XXX111	2605	1XXXXX1XX1

(kHz)	NOPQRSTUVW	(kHz)	NOPQRSTUVW	(kHz)	NOPQRSTUVW
2610	1XXXXX1X1X	2750	1XXX1XX11X	2890	1XX1XXXX1X
2615	1XXXXX1X11	2755	1XXX1XX111	2895	1XX1XXXX11
2620	1XXXXX11XX	2760	1XXX1X1XXX	2900	1XX1XXX1XX
2625	1XXXXX11X1	2765	1XXX1X1XX1	2905	1XX1XXX1X1
2630	1XXXXX111X	2770	1XXX1X1X1X	2910	1XX1XXX11X
2635	1XXXXX1111	2775	1XXX1X1X11	2915	1XX1XXX111
2640	1XXXX1XXXX	2780	1XXX1X11XX	2920	1XX1XX1XXX
2645	1XXXX1XXX1	2785	1XXX1X11X1	2925	1XX1XX1XX1
2650	1XXXX1XX1X	2790	1XXX1X111X	2930	1XX1XX1X1X
2655	1XXXX1XX11	2795	1XXX1X1111	2935	1XX1XX1X11
2660	1XXXX1X1XX	2800	1XXX11XXXX	2940	1XX1XX11XX
2665	1XXXX1X1X1	2805	1XXX11XXX1	2945	1XX1XX11X1
2670	1XXXX1X11X	2810	1XXX11XX1X	2950	1XX1XX111X
2675	1XXXX1X111	2815	1XXX11XX11	2955	1XX1XX1111
2680	1XXXX11XXX	2820	1XXX11X1XX	2960	1XX1X1XXXX
2685	1XXXX11XX1	2825	1XXX11X1X1	2965	1XX1X1XXX1
2690	1XXXX11X1X	2830	1XXX11X11X	2970	1XX1X1XX1X
2695	1XXXX11X11	2835	1XXX11X111	2975	1XX1X1XX11
2700	1XXXX111XX	2840	1XXX111XXX	2980	1XX1X1X1XX
2705	1XXXX111X1	2845	1XXX111XX1	2985	1XX1X1X1X1
2710	1XXXX1111X	2850	1XXX111X1X	2990	1XX1X1X11X
2715	1XXXX11111	2855	1XXX111X11	2995	1XX1X1X111
2720	1XXX1XXXXX	2860	1XXX1111XX	3000	1XX1X11XXX
2725	1XXX1XXXX1	2865	1XXX1111X1	3250	1X1XXX1X1X
2730	1XXX1XXX1X	2870	1XXX11111X	3500	1X1X1111XX
2735	1XXX1XXX11	2875	1XXX111111	3750	1X111X111X
2740	1XXX1XX1XX	2880	1XX1XXXXXX		
2745	1XXX1XX1X1	2885	1XX1XXXXX1		

Table Three X = Clip

Hertz	AA	BB	CC	DD	EE
67.00	X	X	X	X	X
71.90	X	X	X	X	1
77.00	X	X	X	1	X
82.50	X	X	X	1	1
88.50	X	X	1	X	X
94.80	X	X	1	X	1
100.0	X	X	1	1	X
103.5	X	X	1	1	1
107.2	X	1	X	X	X
110.9	X	1	X	X	1
114.8	X	1	X	1	X
118.8	X	1	X	1	1
123.0	X	1	1	X	X
127.3	X	1	1	X	1
131.8	X	1	1	1	X
136.5	X	1	1	1	1
141.3	1	X	X	X	X
146.2	1	X	X	X	1
151.4	1	X	X	1	X
156.7	1	X	X	1	1
162.2	1	X	1	X	X
167.9	1	X	1	X	1
173.8	1	X	1	1	X
179.9	1	X	1	1	1
186.2	1	1	X	X	X
192.8	1	1	X	X	1
203.5	1	1	X	1	X
210.7	1	1	X	1	1
218.1	1	1	1	X	X
225.7	1	1	1	X	1
233.6	1	1	1	1	X
241.8	1	1	1	1	1

Continued from Page 1

390 kHz calls for cutting jumpers N, O, P, R, S and W. 3. Clip F1 LOW jumper at upper left if you want lower frequency on channel one, otherwise clip F1 HIGH to put higher frequency on channel one. The remaining frequency will fall on channel two. 4. Clip CTCSS diodes using Table Three. Both channels will operate on the same tone.

Simplex without tone on either channel (MSG light disabled): 1. Follow procedure for setting frequencies and channels described in the two channel simplex paragraph above. 2. Clip "MIC" jumper at upper left. 3. Turn tone deviation pot (R517) to minimum (Max. CW). 4. Clip "Z" diode at lower left.

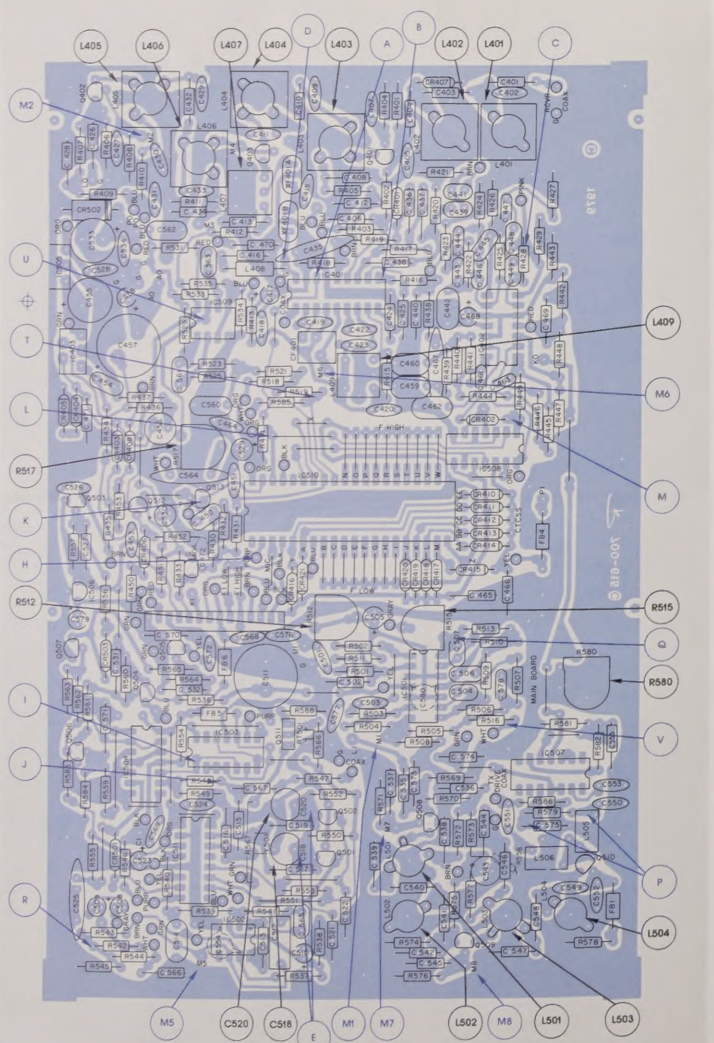
Simplex with one channel tone (MSG light operates only on channel with tone): Note the unit cannot be configured to operate with tone on higher frequency and without tone on lower frequency. 1. Follow frequency and channel selection procedures in paragraph describing two channel simplex above. 2. Clip CTCSS diodes for tone selected using Table Three. 3. Clip diode at lower left marked "Z". Tone will operate on lower frequency.

Half Duplex one channel, Simplex other channel, CTCSS on both channels: 1. If transmit frequency on half duplex channel is higher than receive frequency, proceed to step 5 below. 2. If receive on half duplex is higher, clip F LOW diodes and jumpers for half duplex channel transmit frequency. Clip F HIGH jumpers to the receive frequency. NOTE: The radio is incapable of synthesizing more than two different frequencies. When the receive frequency on half duplex is higher, the simplex channel must transmit and receive on that frequency. 3. Clip "X" jumper at upper right. 4. Clip F1 LOW jumper at upper left if you want Half Duplex mode on channel one. For half duplex on channel two clip F1 HIGH jumper at upper left. The remaining simplex frequency will automatically fall in the other channel. Skip step 5 and proceed with 6. 5. Clip F LOW diodes and jumpers at left of processor for simplex frequency. Clip F HIGH jumpers at right of processor for duplex frequency. Set frequencies into channels as described in step 4. 6. Clip "Y" diode at upper left. 7. Clip CTCSS diodes using Table Three.

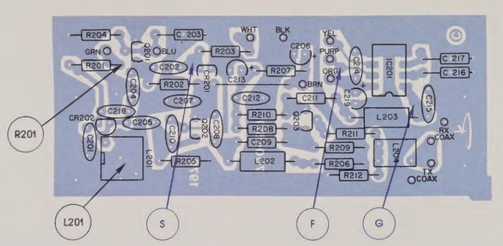
Half duplex one channel, Simplex other channel, No CTCSS (MSG light disabled): 1. Follow procedure for half duplex/simplex configuration directly above. 2. Clip "MIC" jumper at upper left. 3. Turn tone deviation pot (R517) to minimum position (Max. CW). 4. Clip "Z" diode at lower left.

Half Duplex with CTCSS, Simplex without CTCSS (MSG. light for half duplex channel only): 1. Follow procedure for setting frequencies and channels described in first half duplex/simplex configuration above. 2. Clip "Z" diode at lower left. 3. Clip diodes for CTCSS tone. 4. Clip "Y" diode at upper left.

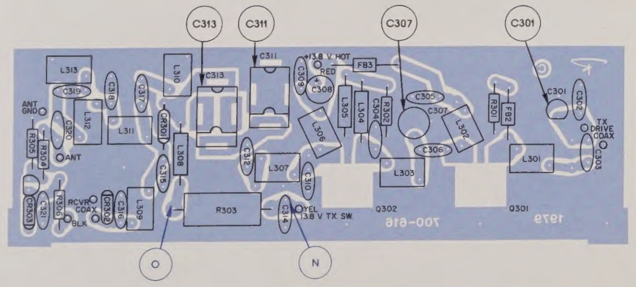
Main Board



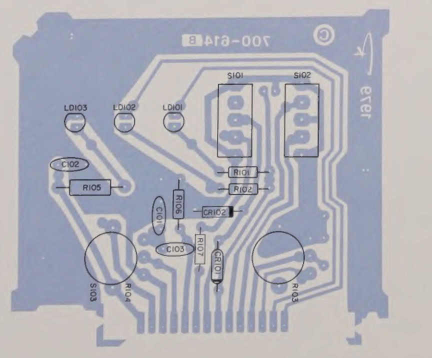
VCO Board



P A Board



Control Board



Tuning Procedures

A. Receiver Alignment Procedure

1. Initial VCO setting; monitor the D.C. voltage at M5 on the main board or the voltage on R201 on the VCO board. Adjust L201 for 5.0V, or as close to 5.0V as the tuning will permit. Access to L201 is through a hole in the left side of the chassis.
2. Connect a D.C. voltmeter between M2 and ground. Tune L405 for a dip on voltmeter.
3. Connect a D.C. voltmeter between M3 and ground. Tune L406 for a peak on voltmeter; retune L405 and L406 for a peak on M3.
4. Unsquelch the receiver and attach an RMS voltmeter across speaker. Adjust volume control to a comfortable noise level. Note reference noise level.
5. Connect an RF generator to the antenna connector; set at the correct frequency. Increase the level until approximately 15 dB quieting is obtained.
6. Tune L401, L402, L403 and L404 for minimum noise. While tuning, decrease RF generator level to keep approximately 15 to 20 dB quieting.
7. Repeat Step #6.

B. Transmitter Alignment Procedure

Initial

1. Tune transmitter for F HIGH unless one channel option is used.
2. Tune VCO if not adjusted before, for approximately 5V. at M5.
3. Connect a D.C. voltmeter between M8 and ground. Set on +2 V.D.C. range.
4. Adjust R580 (100K pot) to maximum clockwise position.

Tuning: Key the radio UP for the following Steps.

NOTE: Tune coils from bottom of board.

1. Tune
   a) L501 and L502 for a peak voltage on DC voltmeter.
   b) L503 for a null.
   c) L504 for a peak voltage.
2. Tune C301, C307, C311 and C313 for maximum power output.
3. Repeat Step #2.
4. Repeat Step #1 and Step #2.
5. Adjust R580 (100K pot) counter clockwise for a 25 watt output.
6. Tune VCO voltage, M5, to 7.0V, or as close to 7.0V as the tuning will permit. Unkey radio.

C. TX Audio Alignment

1. Turn tone deviation pot (R517) to maximum clockwise position (minimum).
2. Connect an audio signal generator, set at 1 KHz, to the dummy microphone input.
3. Using a scope to monitor M1, adjust R512 for a symetrical looking waveform.
4. Increase the output of the audio generator and continue to adjust R512 for symetrical clipping as limiting is reached.
5. Remove the scope probe.
6. Adjust the audio generator output for 1 Vrms @ 1 KHz and key up the transmitter.
7. Using a deviation monitor, adjust R515 for 4.5 KHz deviation.
8. Remove the 1 KHz audio from the microphone input and adjust R517 counter clockwise for the desired sub-audible tone deviation (~ ±750 Hz).
9. Apply the 1 KHz audio as before and adjust R515 for the required 5 KHz deviation.

D. Frequency Calibration

1. Instructions for one channel simplex radios

   For transmit frequency adjustment, connect a counter to the antenna connector through an appropriate attenuator. If the frequency is an even multiple of 5 KHz, adjust C520. If the frequency is an odd multiple of 5 KHz, adjust C518.

   For receiver frequency adjustment, connect a counter to the local oscillator injection point, M4 through a 27pf capacitor. If the frequency is an even multiple of 5 KHz, adjust C518. If the frequency is an odd multiple of 5 KHz, adjust C520.
2. Instructions for two channel simplex radios

   For transmit frequency adjustment, connect a counter to the antenna connector through an appropriate attenuator. There are three possible combinations to consider.
   a) If both transmit frequencies are even multiples of 5 KHz, select the highest frequency and adjust C520. Proceed to receiver adjustment.
   b) If both transmit frequencies are odd multiples of 5 KHz, select the highest frequency and adjust C518. Proceed to receiver adjustment.
   c) If the transmit frequencies include one even and one odd multiple of 5 KHz, select the even channel and adjust C520. Then select the odd channel and adjust C518. In this case, this procedure also completes the receiver frequency adjustment.

   For receiver frequency adjustment there are two remaining combinations to consider. Connect a counter to the local oscillator test point, M4 through a 27pf capacitor.
   a) If both receive frequencies are even multiples of 5 KHz, select the highest frequency and adjust C518. This completes the frequency setting for this combination.
   b) If both receive frequencies are odd multiples of 5 KHz, select the highest frequency and adjust C520. This completes the frequency setting for this combination.
3. Instructions for Half Duplex one channel radios

   For transmit frequency adjustment, connect a counter to the antenna connector through an appropriate attenuator. If the frequency is even multiple of 5 KHz, adjust C520. If the frequency is an odd multiple of 5 KHz, adjust C518.

   For receiver frequency adjustment, connect a counter to the local oscillator injection point, M4 through a 27pf capacitor. If the following instruction calls for the same tuning capacitor to be adjusted, leave the adjustment as it is set for the transmit mode. If the frequency is an even multiple of 5 KHz, adjust C518. If the frequency is an odd multiple of 5 KHz, adjust C520.
4. Instructions for Half Duplex with one talk around channel

   For transmit frequency adjustment, connect a counter to the antenna connector through an appropriate attenuator. There are three possible combinations to consider.
   a) If both transmit frequencies are even multiples of 5 KHz, select the highest frequency and adjust C520. Proceed with the receiver adjustment.
   b) If both transmit frequencies are odd multiples of 5 KHz, select the highest frequency and adjust C518. Proceed with the receiver adjustment.
   c) If the transmit frequencies include one even and one odd multiple of 5 KHz, select the even channel and adjust C520. Then select the odd channel and adjust C518. In this case, this procedure also completes the receiver frequency adjustment.

   For receiver adjustment, connect a counter to the local oscillator injection test point, M4 through a 27pf capacitor. If the frequency is an even multiple of 5 KHz, adjust C518. If the frequency is an odd multiple of 5 KHz, adjust C520.

F. I.F. Alignment

1. If radio came from stock, this procedure does not have to be done.
2. Use the F HIGH receiver frequency for this alignment.
3. Connect an RF generator (no modulation) to the antenna connector and increase level to obtain 15 dB quieting on RMS voltmeter. Tune L407 for minimum noise.
4. Modulate the generator with 1 KHz tone and 3 KHz deviation and adjust volume control for 10% rated audio output. Increase level to 1000 μV. Tune L409 for peak audio output.

Troubleshooting Procedures

Before troubleshooting, check frequency and tone jumpers and diodes selection. Also check configuration jumpers and diodes for correct set-up.

A. Receiver Troubleshooting

I. **No Audio Output**
   1. Voltage at A
      a) Check for 5V with squelch open. Check associated circuitry for short to ground.
   2. Noise at B
      a) Noise voltage should be 2.0 VPP. Check tuning of L409.
   3. Noise at C
      a) Noise voltage should be 200 mVPP. Check biasing on IC402 and associated circuitry.
   4. Noise at Aϕ
      a) Check wiring to speaker and speaker jack.
      b) Check D.C. voltages around IC403 and Q404.
      c) Check volume control setting.

II. **Poor Sensitivity**
   1. L.O. Frequency
      a) Check frequency with a counter measured through a 27 PF capacitor. If not correct, check voltage at E. Either Q501 or Q502 should be 5V, but not both. Also check frequency calibration procedure.
   2. Voltage at D
      a) Check for 400 mVPP with −35 dBm RF. Check receiver front end and doubler tuning and associated D.C. voltages.
   3. Voltage on M6
      a) Check for 100 mVPP with −80 dBm (23 μV) RF signal. Check D.C. voltages associated with IC401.

III. **No Sensitivity**
   1. Complete Poor Sensitivity Procedure First
   2. Voltage at M5
      a) Voltage should be between 2.5 and 6.5V. Tune L201 for 5V or as close as the tuning will permit on F HIGH channel.
      b) Check D.C. voltages around IC502 and Q201. If tuning is not correct, go to Step 5.
   3. Drive at Lϕ
      a) Disconnect Lϕ and check D.C. bias point at M3. With drive, M3 should increase at least by 0.5 VDC.
   4. Voltages at M2 and M3
      a) Check tuning of L405 and L406. M3 should have a definite peak. Check associated voltages around Q402.
   5. Voltage at K
      a) Check for 5V. If not, check for D.C. voltage around Q512 and Q513 and possible shorts.
   6. Voltage at H
      a) Voltage should be 4 VPP square wave at 3.4 MHz. If not, check connection from Pin 9 IC403.
      b) Voltage at I should be 4 VPP square wave at 10.24 MHz. If not, check associated circuitry of IC504.
      c) Voltage at J should be 3.0 VPP at 10.24 MHz. If not, check associated circuitry around Y501 and IC511.
   7. Voltage at G
      a) Check for 600 mVPP at ~ 75 MHz. Check biasing voltage on Q203 and Q202.
   8. Voltage at F
      a) Voltage should be 4 VPP square wave at ~ 5 MHz. Check D.C. voltages on IC201.

IV. **CTCSS Not Operational**
   1. Mic Jumper and 'Z' Diode.
      a) Check for correct configuration set-up. Ground microphone hangup point on back of microphone.
   2. Voltage at M
      a) Check for 2.5 VPP (bottom clipped) at correct frequency and 500 Hz deviation. Check associated circuitry and voltages on IC402.
   3. Voltage at L
      a) Voltage should be 4 VPP square wave with 500 Hz deviation at correct tone frequency. Check associated voltages around IC508.

B. Transmitter Troubleshooting

I. **No Power**
   1. Voltage at M5 (5-7V)
      a) Tune L201 if M5 is not correct in both the TX and RX mode.
      b) If M5 is incorrect only in the TX mode, check for the proper voltage at the collector of Q201.
   2. 8V TX Sw.
      a) Check the voltages of Q503, Q507, and IC504.
   3. 13.8 V at P.A. Bd.
      a) Check the wire connection from Pϕ to the P.A. board.
   4. Voltage at N (13.6V)
      a) Check the operation of Q505.
      b) Check the wire connection from N to the P.A. board.
   5. Voltage at O (1.4V)
      a) Check the continuity of CR301, CR302 and L308.
   6. Voltage at Pin 10 of IC507 is 11V to 12V
      a) Check the voltage of IC507 and associated circuitry.
   7. Voltage difference at P
      a) If less than 1V, go to Step 8. Otherwise, go to Step 9.
   8. Tune L501, L502, L503 and L504.
      a) If the tuning is improper, check the voltages on Q508 and Q509.
      b) RF Input at L1 should be 1 mW @ f/2.
   9. Current (I_c) to the P.A. Bd. (3.5-4.5 Amps)
      a) Disconnect the P.A. 13.8V lead from Pϕ and insert a 5 amp D.C. ammeter.
      b) If I_c is less than 300 ma, check Q301 and associated circuitry.
      c) If I_c is greater than 300 ma, check Q302 and associated circuitry.

II. **Low Power**
   1. Power Control Pot
      a) Check the adjustment of R580.
   2. Go to steps I_4, I_5, I_6, I_7, I_8, I_9

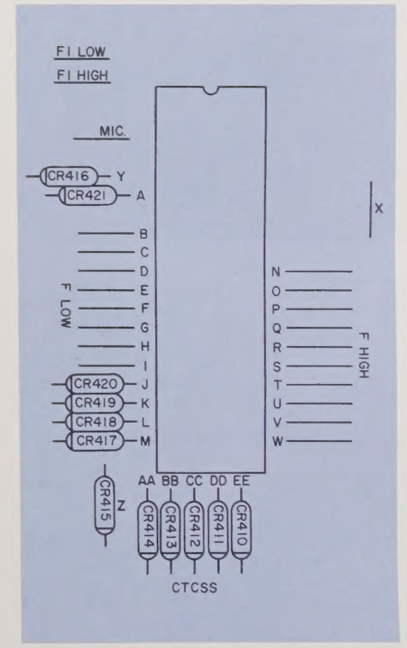
III. **Transmit Audio and Modulation**
   1. Output at M1 (symmetrical waveform)
      a) With 100 mV 1 KHz sine wave at dummy microphone input, waveform should be symmetrical.
      b) If no output, check the voltages of IC501.
   2. Output at Q (symmetrical waveform)
      a) Check for the proper D.C. voltages on IC501.
      b) Check that R515 (10K Pot) is not shorted.
   3. Voltage at R
      a) Check for 8V at the Junction of R543 and C577.
      b) Check for proper component values.
   4. Voltage at S
      a) Check for a shorted CR201.

IV. **No CTCSS Tone**
   1. Output at T (4.5 VPP square wave)
      a) Is the radio in the proper configuration for tone operation?
      b) Check IC510 and its associated components for the proper voltages.
   2. Output at U (symmetrical waveform)
      a) Check the voltages on IC509.
   3. Input AT V (symmetrical waveform)
      a) Check that R517 is properly adjusted.
      b) Check the continuity from U to R516.

Regency

COMMUNICATIONS, INC.

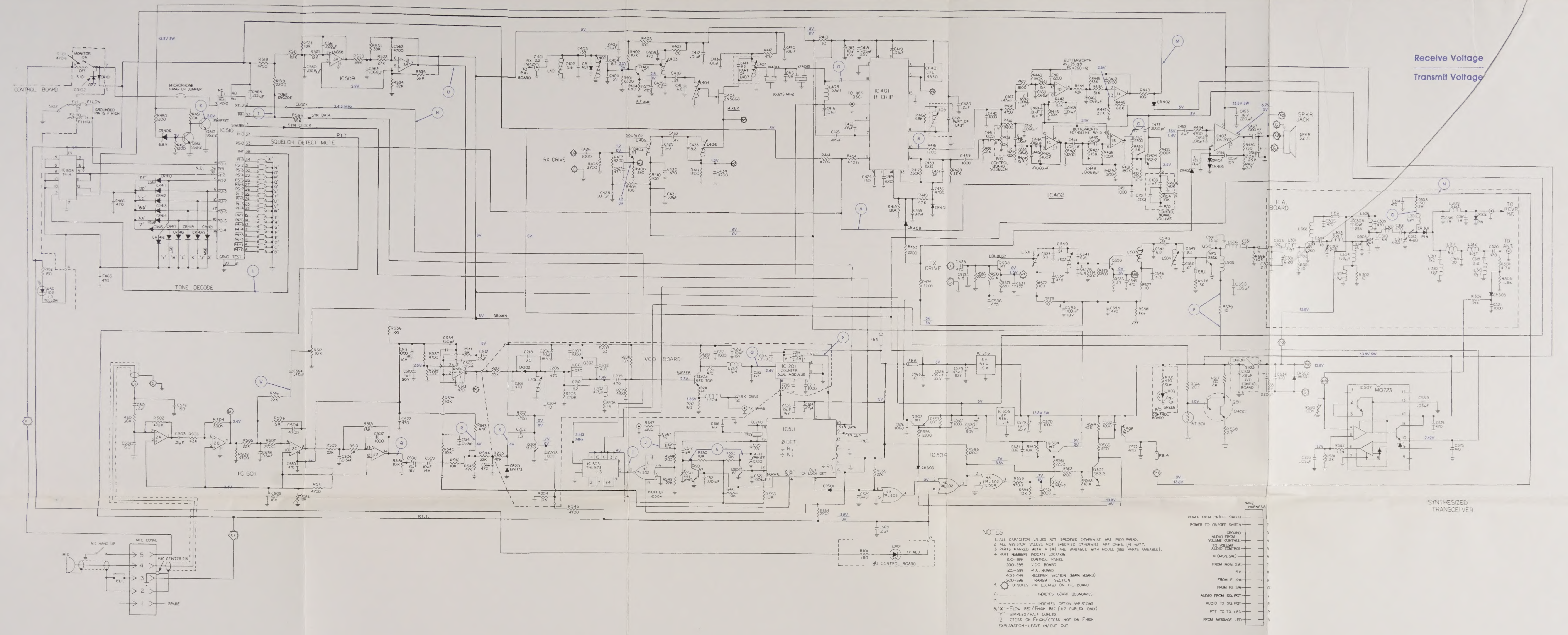
XL2000 SERVICE MANUAL



Model XLH252

3/81

Part No. 0300-4161-200



NOTES

1. ALL CAPACITOR VALUES NOT SPECIFIED OTHERWISE ARE PICO-FARAD.
2. ALL RESISTOR VALUES NOT SPECIFIED OTHERWISE ARE OHMS, 1/4 WATT.
3. PARTS MARKED WITH A (*) ARE VARIABLE WITH MODEL (SEE PARTS VARIABLE).
4. PART NUMBERS INDICATE LOCATION.
   - 100-199 CONTROL PANEL
   - 200-299 VCO BOARD
   - 300-399 P.A. BOARD
   - 400-499 RECEIVER SECTION (MAIN BOARD)
   - 500-599 TRANSMIT SECTION
5. ○ DENOTES PIN LOCATED ON P.C. BOARD
6. —— . —— . —— INDICTES BOARD BOUNDARIES
7. - - - - - - - - - - INDICATES OPTION VARIATIONS
8. 'X' - FLOW REC/FHIGH REC (1/2 DUPLEX ONLY)
   'Y' - SIMPLEX/HALF DUPLEX
   'Z' - CTCSS ON FHIGH/CTCSS NOT ON FHIGH
   EXPLANATION - LEAVE IN/CUT OUT

Parts List

Control Board 100's

Item	Description	Part No.
	CAPACITORS	
C101	.001 mfd, 50V, +80 -20% (Disc)	1503-0102-003
C102	.01 mfd, 50V, +80 -20% (Disc)	1502-0103-007
C103	.1 mfd, 12V, +80, -20% (Disc)	1502-0104-006
	DIODES	
CR101	Germanium	4807-1305-800
CR102	Silicon	4805-1241-200
LD101	LED (Red)	4810-1282-905
LD102	LED (Yellow)	4810-1321-400
LD103	LED (Green)	4810-1299-300
	RESISTORS	
R101	180 ohm, 5%, ¼W	4704-0181-032
R102	150 ohm, 5%, ¼W	4704-0151-032
R103	10K, Trimmer (Squelch)	4751-3278-101
R104	10K, Trimmer (Volume)	4751-3294-801
R105	470 ohm, 10%, ½W	4701-0471-044
R106	10K, 5%, ¼W	4704-0103-032
R107	470 ohm, 5%, ¼W	4704-0471-032
	SWITCH	
S101	Switch, Slide	5113-5154-001

VCO Board 200's

Item	Description	Part No.
	CAPACITORS	
C201	470pf, 50V, 20% (Disc)	1523-0471-002
C202	Cap Mud, 2.2pf, Type MC, 10%	1510-0229-900
C203	.001 mfd, 50V, 10% (Tub. Cer.)	1538-0102-601
C204	10pf, 10%, NPO (Disc)	1500-0100-605
C205	470pf, 50V, 20% (Disc)	1523-0471-002
C206	10 mfd, 16V (Electrolytic)	1513-0100-002
C207	.001 mfd, 50V, +80 -20% (Disc)	1503-0102-003
C208	6.8pf, 500V, NPO, 5% (Disc)	1500-0689-505
C209	470pf, 50V, 10% (Tub. Cer.)	1538-0471-601
C210	8.2pf, 500V, NPO, 5% (Disc)	1500-0829-505
C211	470pf, 50V, 10% (Tub. Cer.)	1538-0471-601
C212	.001 mfd, 50V, +80 -20% (Disc)	1503-0102-003
C213	10 mfd, 16V (Electrolytic)	1513-0100-002
C214	.05 mfd, 25V, +80 -20% (Disc)	1502-0503-004
C215	4.7pf, 500V, NPO, 10% (Disc)	1500-0479-905
C216	.001 mfd, 50V, 10% (Tub. Cer.)	1538-0102-601
C217	.001 mfd, 50V, 10% (Tub. Cer.)	1538-0102-601
C218	9pf, 5%, NPO, 500V (Disc)	1500-0090-505
C219	10 mfd, 16V (Electrolytic)	1513-0100-002
	DIODES	
CR201	MV1172, Varicap	4809-0000-001
CR202	MV2107, Varicap	4809-0000-011
	INTEGRATE CIRCUITS	
IC201	Dual Modulus, Counter	3130-6060-605
	COILS	
L201	10MM	1800-5149-704
L202	Choke, 4.7 μHy	1803-3268-211
L203	Choke, 1.0 μHy	1803-3268-210
L204	LM-2, 4½ Turns (Yellow)	1803-5125-902
	TRANSISTORS	
Q201	Silicon, NPN, General Purpose	4801-0000-016
Q202	Field Effect, Junction	4811-0000-020
Q203	Silicon, NPN, (Red Top)	4801-0000-035
	RESISTORS	
R201	22K, 5%, ¼W	4704-0223-032
R202	4700 ohm, 5%, ¼W	4704-0472-032
R203	47K ohm, 5%, ¼W	4704-0473-032
R204	10K ohm, 5%, ¼W	4704-0103-032
R205	270K, 5%, ¼W	4704-0274-032
R206	1000 ohm, 5%, ¼W	4704-0102-032
R207	33 ohm, 5%, ¼W	4704-0330-032
R208	10K ohm, 5%, ¼W	4704-0103-032
R209	4700 ohm, 5%, ¼W	4704-0472-032
R210	100 ohm, 5%, ¼W	4704-0101-032
R211	68 ohm, 5%, ¼W	4704-0680-032
R212	180 ohm, 5%, ¼W	4704-0181-032

Power Amplifier Board 300's

Item	Description	Part No.
	CAPACITORS	
C301	6-20pf, Red (Variable)	1517-3295-303
C302	27pf, 5%, NPO, 50V (Disc)	1500-0270-550
C303	82pf, 5%, NPO, 50V (Disc)	1524-0820-002
C304	56pf, 5%, NPO, 50V (Disc)	1524-0560-002
C305	470pf, 50V, 20% (Disc)	1523-0471-002
C306	18pf, 50V, 5% (Disc)	1500-0180-550
C307	2-18pf (Variable)	1517-0000-001
C308	10 mfd, 25V (Electrolytic)	1513-0100-003
C309	470pf, 50V, 20% (Disc)	1523-0471-002
C310	68pf, NPO, 50V, 5% (Disc)	1524-0680-002
C311	4-60pf (Variable)	1517-0000-002
C312	470pf, 50V, 5% (Mica)	1506-0471-550
C313	4-60pf (Variable)	1517-0000-002
C314	470pf, 50V, 20% (Disc)	1523-0471-002
C315	18pf, 500V, 5% (Disc)	1500-0180-505
C316	18pf, 500V, 5% (Disc)	1500-0180-505
C317	8.2pf, 500V, NPO, 5% (Disc)	1500-0829-505
C318	20pf, 500V, 10% (Disc)	1500-0200-605
C319	8.2pf, 500V, NPO, 5% (Disc)	1500-0829-505
C320	470pf, 50V, 5% (MICA)	1506-0471-550
C321	.001 mfd, 50V, +80 -20% (Disc)	1503-0102-003
	DIODES	
CR301	Pin, UM9484	4815-3408-600
CR302	Pin, UM9484	4815-3408-600
CR303	Hot Carrier, MBD201	4816-3302-200
	COILS	
FB2	Ferrite, Bead, W/Lead	2502-3293-901
FB3	Ferrite, Bead, W/Lead	2502-3293-901
L301	LM-2, 2½ Turns (Violet)	1803-5125-901
L302	LM-2, 10½ Turns (Natural)	1803-5125-912
L303	LM-2, 31/2 Turns (Red)	1803-5125-906
L304	Choke, 1.8 μHy	1803-3268-208
L305	Choke, 1.8 μHy	1803-3268-208
L306	LM-2, 7½ Turns (Violet)	1803-5125-913
L307	LM-2, 2½ Turns (Violet)	1803-5125-901
L308	Choke, 1.0 μHy	1803-3268-210
L309	LM-2, 5½ Turns (Green)	1803-5125-905
L310	LM-2, 1½ Turns (Orange)	1803-5125-907
L311	LM-2, 6½ Turns (Blue)	1803-5125-909
L312	LM-2, 6½ Turns (Blue)	1803-5125-909
L313	LM-2, 1½ Turns (Orange)	1803-5125-907
	TRANSISTORS	
Q301	RF, Power	4804-3411-801
Q302	RF, Power	4804-3411-802
	RESISTORS	
R301	10 ohm, 5%, ¼W	4704-0100-032
R302	10 ohm, 5%, ¼W	4704-0100-032
R303	150 ohm, 5%, 2W	4701-0151-046
R304	4.7K, 5%, ¼W	4704-0472-032
R305	1.8K, 5%, ¼W	4704-0182-032
R306	39K, 5%, ¼W	4704-0393-032

Receiver Section Of Main Board 400's

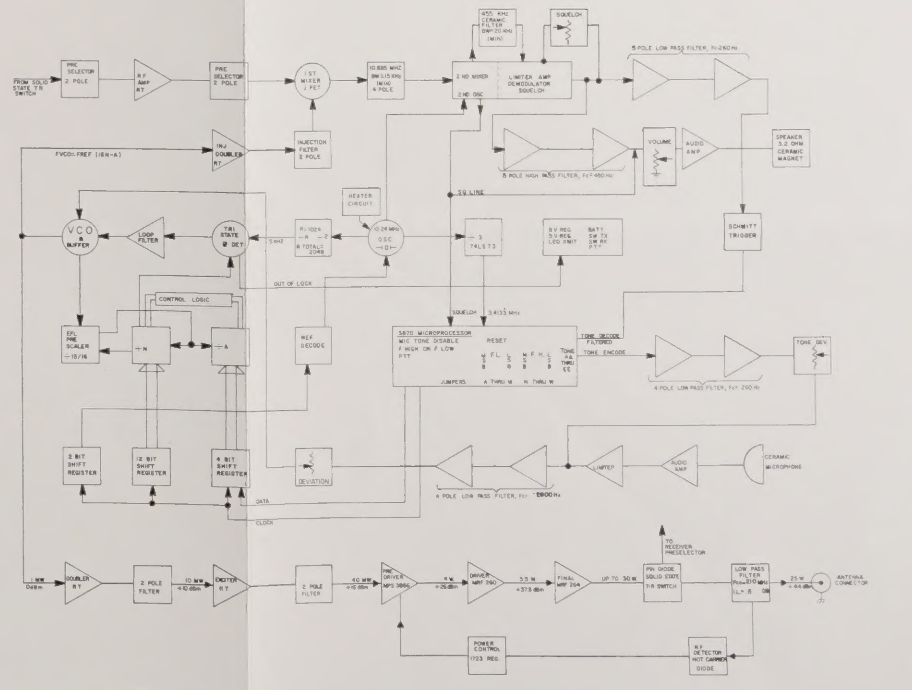
Item	Description	Part No.
	CAPACITORS	
C401	Cap Mud, 2.2pf, 10% Type MC	1510-0229-900
C402	5.6pf, 500V, NPO, 5% (Disc)	1500-0569-505
C403	Cap Mud, .39pf, 10%, Type MC	1510-0398-900
C404	8.2pf, 10%, 50V, NPO (Tub. Cer.)	1538-0829-608
C405	39pf, 50V, 5% (Disc)	1500-0390-550
C406	.01 mfd, 25V, 30% (Tub. Cer.)	1538-0103-804
C407	470pf, 50V, 20% (Disc)	1523-0471-002
C408	470pf, 10%, 50V (Tub. Cer.)	1538-0471-601
C409	5.6pf, 500V, NPO, 5% (Disc)	1500-0569-505
C410	Cap Mud, .39pf, 10%, Type MC	1510-0398-900
C411	6.8pf, 500V, NPO, 5% (Disc)	1500-0689-505
C412	.01mfd, 25V, 30% (Tub. Cer.)	1538-0103-804
C413	.01 mfd, 25V, 30% (Tub. Cer.)	1538-0103-804
C414	Not Used	
C415	3.9pf, .25pf, 500V (Disc)	1500-0399-205
C416	.01 mfd, 25V, 30% (Tub. Cer.)	1538-0103-804
C417	10 mfd, 16V (Electrolytic)	1513-0100-002
C418	.05 mfd, 25V, +80 -20% (Disc)	1502-0503-004
C419	.01 mfd, 50V, +80 -20% (Disc)	1502-0103-007
C420	.2 mfd, 12V, +80 -20% (Disc)	1502-0204-006
C421	Not Used	
C422	.05 mfd, 25V, +80 -20% (Disc)	1502-0503-004
C423	.05 mfd, 25V, +80 -20% (Disc)	1502-0503-004
C424	150pf, 50V, 10% (Tub. Cer.)	1538-0151-601
C425	.001 mfd, 50V, 10% (Tub. Cer.)	1538-0102-601
C426	.001 mfd, 50V, 10% (Tub. Cer.)	1538-0102-601
C427	470pf, 50V, 20% (Disc)	1523-0471-002
C428	.01 mfd, 25V, 30% (Tub. Cer.)	1538-0103-804
C429	6.8pf, 500V, NPO, 5% (Disc)	1500-0689-505
C430	470pf, 50V, 20% (Disc)	1523-0471-002
C431	.01 mfd, 50V, +80 -20% (Disc)	1502-0103-007
C432	Cap Mud, .47pf, 10%, Type MC	1510-0478-900
C433	8.2pf, 500V, NPO, 5% (Disc)	1500-0829-505
C434	4700pf, 10%, 50V (Tub. Cer.)	1538-0472-626
C435	.47 mfd, +80 -20%, 12V (Disc)	1502-0474-006
C436	4700pf, 10%, 50V(Tub. Cer.)	1538-0472-626
C437	68pf, 50V, NPO, 5% (Tub. Cer.)	1538-0680-509
C438	.001 mfd, 50V, 10% (Tub. Cer.)	1538-0102-601
C439	.001 mfd, 100V, 5% (Mylar Film)	1508-0102-510
C440	.001 mfd, 50V, 10% (Tub. Cer.)	1538-0102-601
C441	.001 mfd, 100V, 5% (Mylar Film)	1508-0102-510
C442	.068 mfd, 100V, 10% (Mylar Film)	1508-0683-610
C443	.015 mfd, 100V, 5% (Mylar Film)	1508-0153-510
C444	.015 mfd, 100V, 5% (Mylar Film)	1508-0153-510
C445	.0068μF, 100V, 5% (Mylar Film)	1508-0682-610
C446	.015 mfd, 100V, 5% (Mylar Film)	1508-0153-510
C447	.015 mfd, 100V, 5% (Mylar Film)	1508-0153-510
C448	.0068μF, 100V, 5% (Mylar Film)	1508-0682-610
C449	.015 mfd, 100V, 5% (Mylar Film)	1508-0153-510
C450	.0047 mfd, 100V, 5% (Mylar Film)	1508-0472-510
C451	.001 mfd, 50V, +80 -20% (Disc)	1503-0102-003
C452	Not Used	
C453	.1 mfd, 12V, 20% (Disc)	1502-0104-005
C454	.015 mfd, 100V, 5% (Mylar Film)	1508-0153-510
C455	220 mfd, 16V (Electrolytic)	1513-3254-711
C456	100 mfd, 10V (Electrolytic)	1513-0101-001
C457	1000 mfd, 16V (Electrolytic)	1513-3254-704
C458	2.2μF, 25V	1515-0229-005
C459	.068 mfd, 100V, 10% (Mylar Film)	1508-0683-610
C460	.068 mfd, 100V, 10% (Mylar Film)	1508-0683-610
C461	.0022 mfd, 100V, 5% (Mylar Film)	1508-0222-510
C462	.068 mfd, 100V, 10% (Mylar Film)	1508-0683-610
C463	.0027 mfd, 100V, 5% (Mylar Film)	1508-0272-510
C464	.05 mfd, 25V, +80 -20% (Disc)	1502-0503-004
C465	470pf, 50V, 10% (Tub. Cer.)	1538-0471-601
C466	470pf, 50V, 10% (Tub. Cer.)	1538-0471-601
C467	.47 mfd, +80 -20%, 12V (Disc)	1502-0474-006
C468	10 mfd, 16V (Electrolytic)	1513-0100-002
C469	.01 mfd, 25V, 30% (Tub. Cer.)	1538-0103-804
C470	.01 mfd, 25V, 30% (Tub. Cer.)	1538-0103-804
C471	.01 mfd, 25V, 30% (Tub. Cer.)	1538-0103-804
C472	2000pf, 20%, 50V, Z5F	1523-0202-002
	DIODES	
CR401	Silicon, Signal SP	4805-1241-201
CR402	Germanium	4807-1305-800
CR403	Silicon, Signal	4805-1241-200
CR404	Silicon, Signal SP	4805-1241-201
CR405	Silicon, Signal	4805-1241-200
CR406	Zener, 6.8V, 5% IN5235B	4808-0000-042
CR407	Silicon, Signal	4805-1241-200
CR408	Silicon, Signal	4805-1241-200
CR409	Not Used	
CR410	Germanium	4807-1305-800
CR411	Germanium	4807-1305-800
CR412	Germanium	4807-1305-800
CR413	Germanium	4807-1305-800
CR414	Germanium	4807-1305-800
CR415	Germanium	4807-1305-800
CR416	Germanium	4807-1305-800
CR417	Germanium	4807-1305-800
CR418	Germanium	4807-1305-800
CR419	Germanium	4807-1305-800
CR420	Germanium	4807-1305-800
CR421	Germanium	4807-1305-800
	INTEGRATED CIRCUITS	
IC401	IF Sub. System	3130-6056-500
IC402	Quad Amplifier	3130-3157-637
IC403	Audio Amplifier	3130-5407-602
	COILS	
L401	Antenna Input (orange)	1800-3152-020
L402	RF Input (Orange)	1800-3152-020
L403	RF Input (Red)	1800-3152-036
L404	RF (Green)	1800-3152-037
L405	RF (Green)	1800-3152-037
L406	RF (Green)	1800-3152-037
L407	10MM	1800-6055-902
L408	Choke, 39 μHy	1803-3268-201
L409	455 kHz	1800-6055-801
	TRANSISTORS	
Q401	Silicon, NPN, Red Top	4801-0000-035
Q402	Silicon, NPN, Red Top	4801-0000-035
Q403	Field Effect, Junction	4811-0000-030
Q404	Silicon, NPN, General Purpose	4801-0000-016
	RESISTORS	
R401	8200 ohm, 5%, ¼W	4704-0822-032
R402	10K, 5%, ¼W	4704-0103-032
R403	100 ohm, 5%, ¼W	4704-0101-032
R404	680 ohm, 5%, ¼W	4704-0681-032
R405	100 ohm, 5%, ¼W	4704-0101-032
R406	2700 ohm, 5%, ¼W	4704-0272-032
R407	8200 ohm, 5%, ¼W	4704-0822-032
R408	390 ohm, 5%, ¼W	4704-0391-032
R409	100 ohm, 5%, ¼W	4704-0101-032
R410	100 ohm, 5%, ¼W	4704-0101-032
R411	1200 ohm, 5%, ¼W	4704-0122-032
R412	390 ohm, 5%, ¼W	4704-0391-032
R413	10 ohm, 5%, ¼W	4704-0100-032
R414	4700 ohm, 5%, ¼W	4704-0472-032
R415	68K, 5%, ¼W	4704-0683-032
R416	1200 ohm, 5%, ¼W	4704-0122-032
R417	330K, 5%, ¼W	4704-0334-032
R418	180K, 5%, ¼W	4704-0184-032
R419	47K, 5%, ¼W	4704-0473-032
R420	22K, 5%, ¼W	4704-0223-032
R421	22K, 5%, ¼W	4704-0223-032
R422	8200 ohm, 5%, ¼W	4704-0822-032
R423	22K, 5%, ¼W	4704-0223-032
R424	15K, 5%, ¼W	4704-0153-032
R425	100K, 5%, ¼W	4704-0104-032
R426	1200 ohm, 5%, ¼W	4704-0122-032
R427	15K, 5%, ¼W	4704-0153-032
R428	100K, 5%, ¼W	4704-0104-032
R429	1200 ohm, 5%, ¼W	4704-0122-032
R430	15K, 5%, ¼W	4704-0153-032
R431	180K, 5%, ¼W	4704-0184-032
R432	470K, 5%, ¼W	4704-0474-032
R433	100K, 5%, ¼W	4704-0104-032
R434	4700 ohm, 5%, ¼W	4704-0472-032
R435	2200 ohm, 5%, ¼W	4704-0222-032
R436	150 ohm, 5%, ¼W	4704-0151-032
R437	2.7 ohm, 5%, ¼W	4704-0279-032
R438	4700 ohm, 5%, ¼W	4704-0472-032
R439	8200 ohm, 5%, ¼W	4704-0822-032
R440	180K, 5%, ¼W	4704-0184-032
R441	15K, 5%, ¼W	4704-0153-032
R442	51K, 5%, ¼W	4704-0513-032
R443	33K, 5%, ¼W	4704-0333-032
R444	43K, 5%, ¼W	4704-0433-032
R445	43K, 5%, ¼W	4704-0433-032
R446	51K, 5%, ¼W	4704-0513-032
R447	27K, 5%, ¼W	4704-0273-032
R448	68K, 5%, ¼W	4704-0683-032
R449	100 ohm, 5%, ¼W	4704-0101-032
R450	1200 ohm, 5%, ¼W	4704-0122-032
R451	10K, 5%, ¼W	4704-0103-032
R452	1200 ohm, 5%, ¼W	4704-0122-032
R453	2200 ohm, 5%, ¼W	4704-0222-032
R454	470 ohm, 5%, ¼W	4704-0471-032
	FILTERS	
CF401	4P Ceramic Filter, 455 kHz CFU -455D2	2700-3209-500
XF401A	2P Xtal Filter 10.695 MHz	2705-3299-900
XF401B	2P Xtal Filter 10.695 MHz	2705-3299-900

Transmitter Section Of Main Board 500's

Item	Description	Part No.
	CAPACITORS	
C501	.2 mfd, 12V, +80 -20% (Disc)	1502-0204-006
C502	150pf, 10%, 50V, Y5P (Tub. Cer.)	1538-0151-601
C503	.01μF, MY 5%, 100V	1508-0103-510
C504	.0047 mfd, 100V, 5% (Mylar Film)	1508-0472-510
C505	10 mfd, 16V (Electrolytic)	1513-0100-002
C506	.015 mfd, 100V, 5% (Mylar Film)	1508-0153-510
C507	.001 mfd, 100V, 5% (Mylar Film)	1508-0102-510
C508	10 mfd, 16V (Electrolytic)	1513-0100-002
C509	10 mfd, 16V (Electrolytic)	1513-0100-002
C510	1 mfd, 50V (Electrolytic)	1513-0010-004
C511	1000 mfd, 16V (Electrolytic)	1513-3254-704
C512	.22 mfd, 10% (Polyester Film)	1508-3300-302
C513	470pf, 50V, 10%, Y5P (Tub. Cer.)	1538-0471-601
C514	.068 mfd, 100V, 10% (Mylar Film)	1508-0683-610
C515	470pf, 50V, 10%, Y5P (Tub. Cer.)	1538-0471-601
C516	68pf, NPO, 5% (Tub. Cer.)	1538-0680-509
C517	24pf, 50V, NPO, 5% (Tub. Cer.)	1538-0240-508
C518	4-11pf, Ivory (Variable)	1517-3295-302
C519	33pf, 50V, NPO, 5% (Tub. Cer.)	1538-0330-508
C520	4-11pf, Ivory (Variable)	1517-3295-302
C521	.001 mfd, Y5P, 50V, 10%	1538-0102-601
C522	.001 mfd, Y5P, 50V, 10%	1538-0102-601
C523	10 mfd, 16V (Electrolytic)	1513-0100-002
C524	.05 mfd, 25V, +80 -20% (Disc)	1502-0503-004
C525	.47 mfd, 12V, +80 -20% (Disc)	1502-0474-006
C526	.001 mfd, 50V, +80 -20% (Disc)	1503-0102-003
C527	.001 mfd, 50V, 20% (Tub. Cer.)	1538-0102-601
C528	.05 mfd, 25V, +80 -20% (Disc)	1502-0503-004
C529	47 mfd, 10V (Electrolytic)	1513-0470-001
C530	1 mfd, 50V (Electrolytic)	1513-0100-004
C531	.001μF, +8-2, 50V YZ	1503-0102-003
C532	.001 mfd, 50V, 10% (Tub. Cer.)	1538-0102-601
C533	220 mfd, 16V (Electrolytic)	1513-3254-711
C534	470pf, 50V, 20% (Disc)	1523-0471-002
C535	470pf, 50V, 10% (Tub. Cer.)	1538-0471-601
C536	470pf, 50V, 10% (Tub. Cer.)	1538-0471-601
C537	470pf, 50V, 10% (Tub. Cer.)	1538-0471-601
C538	470pf, 50V, 10% (Tub. Cer.)	1538-0471-601
C539	3.3pf, 50V, NPO (Tub. Cer.)	1538-0339-608
C540	Cap Mud, .39pf, Type MC, 10%	1510-0398-900
C541	6.8pf, 50V, NPO (Tub. Cer.)	1538-0689-608
C542	3.9pf, 50V, NPO (Tub. Cer.)	1538-0399-608
C543	100μF, 10V (Electrolytic)	1513-0101-001
C544	470pf, 50V, 10% (Tub. Cer.)	1538-0471-601
C545	470pf, 50V, 10% (Tub. Cer.)	1538-0471-601
C546	470pf, 50V, 10% (Tub. Cer.)	1538-0471-601
C547	6.8pf, 50V, NPO (Tub. Cer.)	1538-0689-608
C548	Cap Mud, .47pf, Type MC, 10%	1510-0478-900
C549	8.2pf, 500V, NPO, 5% (Disc)	1500-0829-905
C550	.05 mfd, 25V, +80 -20% (Disc)	1502-0503-004
C551	470pf, 50V, 20% (Disc)	1523-0471-002
C552	27pf, 50 V, NPO, 5% (Disc)	1500-0270-650
C553	.05 mfd, 25V, +80 -20% (Disc)	1502-0503-004
C554	150pf, 50V, 20%, Z5F	1523-0151-002
C555	.05 mfd, 25V, +80 -20% (Disc)	1502-0503-004
C556	Not Used	
C557	Not Used	
C558	Not Used	
C559	Not Used	
C560	.068 mfd, 100V, 10% (Mylar Film)	1508-0683-610
C561	.022 mfd, 100V, 5% (Mylar Film)	1508-0223-510
C562	.068 mfd, 100V, 10% (Mylar Film)	1508-0683-610
C563	.0047 mfd, 100V, 5% (Mylar Film)	1508-0472-510
C564	.47 mfd, 12V, +80 -20% (Disc)	1502-0474-006
C565	.015 mfd, 100V, 5% (Mylar Film)	1508-0153-510
C566	470pf, 50V, 10% (Tub. Cer.)	1538-0471-601
C567	24pf, 50V, NPO, 5% (Tub. Cer.)	1538-0240-508
C568	.01 mfd, 50V, +80 -20% (Disc)	1502-0103-007
C569	.2 mfd, 12V, +80 -20% (Disc)	1502-0204-006
C570	.001 mfd, 50V, 10% (Tub. Cer.)	1538-0102-601
C571	.001 mfd, 50V, 10% (Tub. Cer.)	1538-0102-601
C572	470pf, 50V, 20% (Disc)	1523-0471-002
C573	6.8pf, 50V, NPO, 10% (Tub. Cer.)	1538-0689-608
C574	470pf, 50V, 10% (Tub. Cer.)	1538-0471-601
C575	470pf, 50V, 10% (Tub. Cer.)	1538-0471-601
C576	150pf, 50V, 20% (Disc)	1523-0151-002
C577	470pf, 50V, 20% (Disc)	1523-0471-002
C578	.015 mfd, 100V, 5% (Mylar Film)	1508-0153-510
C579	1 mfd, 50V (Electrolytic)	1513-0010-004
C580	470pf, 50V, 20% (Disc)	1501-0471-007
C581	15pf, 50V, NPO, 10% (Disc)	1500-0150-650
	DIODES	
CR501	Germanium	4807-1305-800
CR502	Silicon, Rect. 3 Amp., 3A100	4806-0000-005
CR503	Silicon, Signal, SP	4805-1241-201
	INTEGRATED CIRCUITS	
IC501	Quad Amplifier	3130-3157-637
IC502	Bimos Amplifier	3130-3167-914
IC503	Dual 'D' Flip Flop	3130-3157-634
IC504	Quad Nor Gate	3130-3157-632
IC505	5V, Regulator, 5%	3130-0000-019
IC506	8V, Regulator, 5%	3130-0000-021
IC507	Voltage regulator	3130-3157-655
IC508	Hex Schmitt Trigger	3130,3157-654
IC509	Dual Amplifier	3130-3167-909
IC510	Microprocessor	3130-6060-309
IC511	Cmos Synthesizer	3130-6068-000
	COILS	
L501	RF (Yellow)	1800-3152-035
L502	RF Input (Orange)	1800-3152-020
L503	RF (Orange)	1800-3152-034
L504	RF Input (Orange)	1800-3152-020
L505	LM-2, 8½ Turns (Violet)	1803-5125-910
L506	LM-2, 6½ Turns (Blue)	1803-5125-909
	TRANSISTORS	
Q501	Silicon, NPN (Red Top)	4801-0000-035
Q502	Silicon, NPN (Red Top)	4801-0000-035
Q503	Silicon, NPN (White Top)	4801-0000-060
Q504	Silicon, NPN (White Top)	4801-0000-060
Q505	Silicon, NPN (White Top)	4801-0000-060
Q506	Silicon, NPN, General Purpose	4801-0000-016
Q507	Silicon, NPN, General Purpose	4801-0000-016
Q508	Silicon, NPN (Red Top)	4801-0000-035
Q509	Silicon, NPN (Red Top)	4801-0000-035
Q510	RF Silicon	4801-0000-030
Q511	Silicon, Darlington D40C1	4814-0000-002
Q512	Silicon, NPN, General Purpose	4801-0000-016
Q513	Silicon, NPN, General Purpose	4801-0000-016
	RESISTORS	
R501	36K, 5%, ¼W	4704-0363-032
R502	470K, 5%, ¼W	4704-0474-032
R503	43K, 5%, ¼W	4704-0433-032
R504	330K, 5%, ¼W	4704-0334-032
R505	22K, 5%, ¼W	4704-0223-032
R506	15K, 5%, ¼W	4704-0153-032
R507	2700 ohm, 5%, ¼W	4704-0272-032
R508	4700 ohm, 5%, ¼W	4704-0472-032
R509	22K, 5%, ¼W	4704-0223-032
R510	15K, 5%, ¼W	4704-0153-032
R511	4700 ohm, 5%, ¼W	4704-0472-032
R512	10K, Trimmer	4751-0103-001
R513	15K, 5%, ¼W	4704-0153-032
R514	Not Used	
R515	10K, Trimmer	4751-0103-001
R516	22K, 5%, ¼W	4704-0223-032
R517	10K, Trimmer	4751-0103-001
R518	Not Used	
R519	2200 ohm, 5%, ¼W	4704-0222-032
R520	Not Used	
R521	18K, Ohm, 5%, ¼W	4704-0183-032
R522	Not Used	
R523	18K, ohm, 5%, ¼W	4704-0183-032
R524	Not Used	
R525	12K, 5%, ¼W	4704-0123-032
R526	Not Used	
R527	Not Used	
R528	Not Used	
R529	39K, 5%, ¼W	4704-0393-032
R530	Not Used	
R531	39K, 5%, ¼W	4704-0393-032
R532	Not Used	
R533	27K, 5%, ¼W	4704-0273-032
R534	22K, 5%, ¼W	4704-0223-032
R535	36K, ohm, 5%, ¼W	4704-0363-032
R536	100 ohms, 5%, ¼W	4704-0101-032
R537	4700 ohm, 5%, ¼W	4704-0472-032
R538	2200 ohm, 5%, ¼W	4704-0222-032
R539	10K, 5%, ¼W	4704-0103-032
R540	10K, 5%, ¼W	4704-0103-032
R541	15K, 5%, ¼W	4704-0153-032
R542	10K, 5%, ¼W	4704-0103-032
R543	47K, 5%, ¼W	4704-0473-032
R544	22K, 5%, ¼W	4704-0223-032
R545	47K, 5%, ¼W	4704-0473-032
R546	4700 ohm, 5%, ¼W	4704-0472-032
R547	2200 ohm, 5%, ¼W	4704-0222-032
R548	1200 ohm, 5%, ¼W	4704-0122-032
R549	22K, 5%, ¼W	4704-0223-032
R550	10K, 5%, ¼W	4704-0103-032
R551	10K, 5%, ¼W	4704-0103-032
R552	10K, 5%, ¼W	4704-0103-032
R553	10K, 5%, ¼W	4704-0103-032
R554	2200 ohm, 5%, ¼W	4704-0222-032
R555	22K, 5%, ¼W	4704-0223-032
R556	2200 ohm, 5%, ¼W	4704-0222-032
R557	10K, 5%, ¼W	4704-0103-032
R558	1K, 5%, ¼W	4704-0102-032
R559	4700 ohm, 5%, ¼W	4704-0472-032
R560	10K, 5%, ¼W	4704-0103-032
R561	2200 ohm, 5%, ¼W	4704-0222-032
R562	1200 ohm, 5%, ¼W	4704-0122-032
R563	10K, 5%, ¼W	4704-0103-032
R564	10K, 5%, ¼W	4704-0103-032
R565	1200 ohm, 5%, ¼W	4704-0122-032
R566	1200 ohm, 5%, ¼W	4704-0122-032
R567	100 ohm, 5%, 2W (Wire Wound)	4707-0101-031
R568	2.7 ohm, 5%, ¼W	4704-0279-032
R569	2200 ohm, 5%, ¼W	4704-0222-032
R570	10K, 5%, ¼W	4704-0103-032
R571	220 ohm, 5%, ¼W	4704-0221-032
R572	100 ohm, 5%, ¼W	4704-0101-032
R573	10 ohm, 5%, ¼W	4704-0100-032
R574	1200 ohm, 5%, ¼W	4704-0122-032
R575	6800 ohm, 5%, ¼W	4704-0682-032
R576	39 ohm, 5%, ¼W	4704-0390-032
R577	10 ohm, 5%, ¼W	4704-0100-032
R578	56 ohm, 5%, ¼W	4704-0560-032
R579	10 ohm, 5%, ¼W	4704-0100-032
R580	100K, Trimmer	4751-0104-012
R581	1.2K, 5%, ¼W	4704-0122-032
R582	1.2K, 5%, ¼W	4704-0122-032
R583	1200 ohm, 5%, ¼W	4704-0122-032
R584	10K, 5%, ¼W	4704-0103-032
R585	39K, 5%, ¼W	4704-0393-032
R586	10K, 5%, ¼W	4704-0103-032
	THERMISTOR	
RT501	Thermistor	5300-0000-001
	CRYSTAL	
Y501	10.240 MHz (Special)	2338-3300-501

Hardware

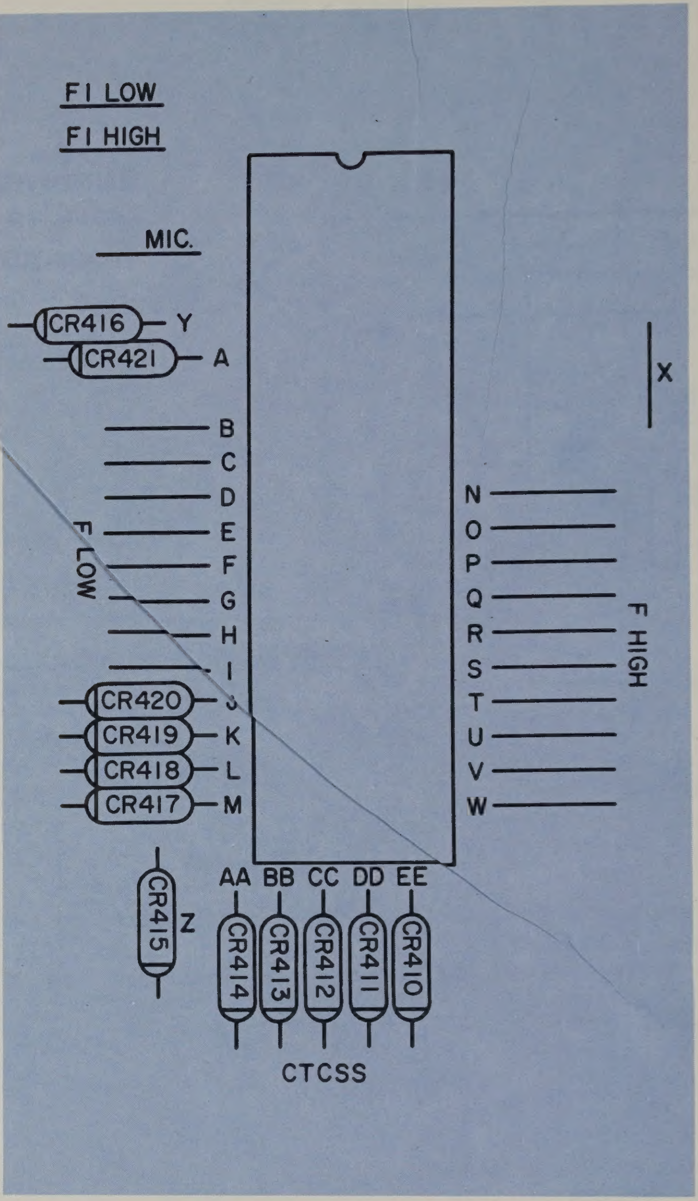
Description	Part No.
Chassis XLH252	1403-7060-303
Contact Pin Malco	2107-0000-003
TX Auto Insert Y	7028-4139-100
Bracket Front Panel	1400-7060-600
Microphone	1300-6069-901
Bracket MOB Mtg. M100	1400-6070-800
Carton MCH40, MCU30, MCL60, MCU15	1404-1410-700
Label Model XLH252	2507-3300-101
Innerpack XLH252	4100-1427-800
Warranty Card MCH40	7000-0000-034
Instruction Manual	7001-4141-300
Hardware Kit	7011-1051-300
Micro-Com DC Power Cord Assy.	7011-1078-100
Envelope Coin	1410-0000-001
Screw 6"x⅝" BH Type AB Cad.	2809-0625-006
Screw ½"x⅝" Hex. W	2811-3416-501
Cont Pin Female	2107-3244-101
Cont Pin Male	2107-3244-201
Conn Housing Female	2109-5120-303
Fuse 5 Amp., 3 AG	5106-0000-008
Wire 18 Ga. Strd., 300V	6018-1288-301
Fuseholder Assy.	7011-1051-000
Case Bot.	1411-7053-004
Knob, Mobile Mtg. Assy.	2402-5148-702
Screw 6"x⅜" Type AB PPH	2809-0375-012
Plascrew 2⅛" Lg	2816-3298-701
Washer .058 Th., St. Cad.	2840-3191-909
Washer, Anti-Rot	2844-6070-701
Body (Fuseholder)	2100-0000-005
Term Inline Dis. ETCO	2106-0000-005
Contact-Fuse ETCO	2107-0000-004
Spring Little Fuse	2513-0000-001
Wire 18 Ga. Strd. 300V	6018-1288-301
Phono Plug	2101-3262-400
Conn. Ant. AVA SPHL239 Nut .085	2105-0000-020
Cover Bott. Chassis	2506-6067-400
Spcr. Thd., 6-32x.437 H	2800-1325-701
Screw 4-40x5/16" Bind.	2803-0312-001
Screw Sem. 6-32x¼"	2807-3298-001
Screw 4x4¼" Type AB	2808-0250-012
Screw 4"x4¼" Type AB H Wash. H	2811-3185-600
Kepnut 4-40x¼" St. Cad.	2852-0440-001
Heatsink To-92	5400-1329-000
Heatsink	5400-3301-200
Heatsink	5400-3301-300
Strap Secur-A-Tie Fast	6005-0000-001
Wire, Tie, Wit 18R Knitlok	6005-0000-002
Main Board Assy.	7011-4138-500
Control Head Assy.	7011-4139-500
PA Board Assy.	7011-4140-000
VCO Board Assy.	7011-4140-500
Chassis Assy. RIV & STKO	7025-4141-100
Spacer Paper Led. Mtg.	2800-1288-707
XLH252	7028-4139-900
Cable Coax RG-316/U	6042-0000-007



XLH 252 HIGH BAND
25 WATT 2 CHANNEL
CTCSS

Frequency and Tone Selection Procedures

The frequency and tone configurations you desire for the XL 2000 are determined by clipping the various jumper wires and diode wires specified for the desired configuration. The illustration to the right shows the diodes and jumpers involved in the process. Please note the letters on the illustration and the circuit board correspond to the columns in the tables that follow. These tables indicate the diodes or jumpers to be clipped with an "X", while jumpers or diodes tabled with a "1" should remain connected. There are three separate tables. First is a table of frequencies for single channel or lower frequency of two channel programming. The second table is used for programming the higher of two frequencies. CTCSS tone programming is done through the third table. For example: using Table One a single channel frequency of 161.010 calls for clipping jumpers: B, D, F, G, H, K and M. Select the configuration you desire using the steps outlined below. We suggest you first review one channel procedures before proceeding to the more detailed two channel section. Please note: jumpers and diodes are referred to as being to the left or right of processor as oriented in illustration at right.



One Channel

Simplex with tone: 1. Clip F LOW diodes and jumpers at left of processor as indicated in table for the frequency you select. 2. Clip jumper on upper left marked F1 HIGH. 3. Clip all jumpers N through W on right of processor (bank marked F HIGH). 4. Clip diodes indicated in CTCSS table for the tone frequency you have selected. (For example: clip diode EE for 233.6 Hz.)

Simplex without tone (MSG light disabled): 1. Clip F LOW diodes and jumpers as indicated in table for the frequency you select. 2. Clip all ten jumpers marked N through W in bank labeled F HIGH at right of processor. 3. Clip jumper labled "MIC" at upper left of processor. 4. Clip "Z" diode at lower left. 5. Turn tone deviation pot (R517) to the minimum position (Maximum CW).

Half Duplex with CTCSS: 1. Clip the F LOW diodes and jumpers at left of processor for the lower frequency, transmit or receive. 2. Clip F HIGH jumpers at right of processor for remaining frequency — higher frequency. Note: To program the higher frequency you must refer to Table Two, F HIGH. Subtract the lower from the higher frequency and reference the difference in Table Two. For example: for frequencies 161.010 MHz and 160.620 MHz the difference of 390 kHz calls for cutting jumpers N, O, P, R, S, and W. 3. Clip "X" jumper at upper right of processor if the higher frequency is receive. Leave connected if F HIGH is transmit. 4. Clip F1 LOW and F1 HIGH jumpers at upper left. 5. Clip "Y" diode at upper left. 6. Clip CTCSS diodes as indicated in CTCSS table, Table Three, for tone selected.

Half Duplex, NO CTCSS (MSG light disabled): 1. Clip F LOW diodes and jumpers at left of processor for lower frequency, transmit or receive. 2. Clip F HIGH jumpers at right for higher of the two frequencies. Note: for this procedure you will need to subtract lower from higher frequency and reference difference in Table Two for programming. See half duplex with CTCSS paragraph above for details. 3. Clip "X" jumper if higher frequency is receive. Leave connected if transmit frequency is higher. 4. Clip F1 LOW and F1 HIGH channel selector jumper at upper left. 5. Clip "Y" diode at upper left. 6. Clip "MIC" jumper at upper left. 7. Adjust tone deviation pot (R517) to minimum (Max. CW).

Two Channel

Simplex — both channels with CTCSS: 1. Clip F LOW diodes and jumpers at left of processor for lower of the two frequencies. 2. Clip F HIGH jumpers at right of processor for higher of the two channel frequencies. NOTE: For this procedure you will need to subtract one frequency from the other and reference the difference in Table Two. For example: for frequencies of 161.010 MHz and 160.620 MHz the difference of

Continued at end of Tables